Planning and sustainable management of coastal zones and high environmental value areas

Coastal zones of the Euro-Mediterranean area are subject to increasing **anthropogenic pressure.** Along the European coasts economic activities compete for vital space with the most fragile and valuable habitats. Due to intense exploitation, natural coastal resources are **degrading**, with subsequent negative social and economic effects.

For such reasons the European Union has introduced Integrated Coastal Zone Management (ICZM). However, in order be effective, ICZM has to be based on **local conditions** as well as on the subsidiary principle. The role of **national and community administrations** is to provide support and guidance to local initiatives by coordinating the numerous national and European policies. In such a context, Interreg III B ARCHIMED "INNOVA", which aims at *"developing a sustainable management model for high environmental value areas of the Mediterranean eco-region through the adoption of* ***common guidelines*** *for monitoring, planning and management"*, can pursue such integrated management in the ARCHIMED Area.

This pubblication intends to gather the inputs resulting from the activities performed by INNOVA Partners,to better guide a more detailed analysis of the topic which will be debated during the **Mediterre Fair 2008**, (7th - 11th of May 2008) at *Fiera del Levante* of Bari, Italy.

partners

- Apulia Region - ITALY Lead Partner
- CIHEAM - Mediterranean Agronomic Institute of Bari (MAIB) - ITALY
- University of Bari - ITALY
- University of Lecce - ITALY
- Polytechnic of Bari - ITALY
- Ministry for Rural Affairs and the Environment MRAE - MALTA
- Institute of Agriculture, University of MALTA
- Agricultural Research Institute (ARI) - CYPRUS
- CIHEAM - Mediterranean Agronomic Institute of Chania (MAICH) - GREECE
- Prefectural Administration of Chania - GREECE
- Ege University - Faculty of Agriculture - TURKEY
- Ministry of Environment and Forestry - TURKEY
- Desert Research Center (DRC) - EGYPT
- Ministry of Agriculture - PALESTINIAN AUTHORITY
- Al Quds University - PALESTINIAN AUTHORITY

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Planning and Sustainable Management of Coastal Zones and High Environmental Value Areas

Regione Puglia

EU

programme INTERREG IIIB ARCHIMED ARCHIPELAGO MEDITERRANEO Sharing a common sea, Sharing a common future

CIHEAM IAM BARI

INNOVA

Establishing Common Models of Integrated Sustainable Monitoring, Planning and Management of High Environmental Value Areas to Control Natural Resources Degradation

June 2006 - March 2008

Final Networks' Meeting & Seminar Proceedings

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Special thanks are extended also to: Damiano Petruzzella, Maria Amoruoso, Giovanni Bruno and Rinaldo Grittani for their valuable support during the Project development.

FOREWORD

Since June 2006, with the start of the project called INNOVA (cod. A.1.222), in the framework of the (CIP) Community Initiative Programme INTERREG III-B - ARCHIMED 2000-2006, a group of fourteen *partners* from different Countries of the Mediterranean basin (Italy, Malta, Cyprus, Turkey, Egypt and Palestine) have been working together for "*establishing common models for the monitoring, planning and integrated sustainable management of high environmental value areas to combat degradation of natural resources*".

Under the supervision and the control of the *Managing Authority of CIP Interreg of the Ministry of Economy and Finance* in Salonicco (Greece), *Regione Puglia*, through its Department for Ecology, participated in the INNOVA project as *lead partner* (LP), and it mainly took on the role of guidance, coordination and stimulus for the planned activities.

Since its early stages, the Mediterranean Agronomic Institute of Bari - IAM-Bari (P2)- has fruitfully cooperated with *Regione Puglia*, together with other national partners of the project like, the University of Bari - UNIBA (P3) and the University of Lecce - UNILE (P4), the Polytechnic of Bari - POLIBA (P5), and foreign partners, namely, the Ministry of Rural Affairs and the Environment (MRAE) of Malta (P6); the Institute of Agriculture of the University of Malta (P7); the Agricultural Research Institute (ARI) of Cyprus (P8); the Mediterranean Agronomic Institute of Chania - MAICh (P9) and the Prefecture of Chania in Greece (P10); the Faculty of Agriculture of the University of Ege in Turkey (P11); the Desert Research Centre (DRC) of Egypt (P12); the Ministry of Agriculture - MoA (P13) and the Palestinian University of Al Quds (P14).

The total budget allocated for the whole project equalled € 1,281,204.00.

With respect to the initially scheduled 19-month length until 31 December 2007, an extension of three months until 31 March 2008 was granted for completing the last activities of the project and performing the statement of accounts.

In Puglia region the oriented Nature Reserve "*Palude del Conte e Duna Costiera di Porto Cesareo*" in the province of Lecce was selected for the validation of the set of indicators and the common guidelines elaborated and collected in the course of the project, through the circulation of interview-based questionnaires to local stakeholders.

On the occasion of the *Final Networks' Meeting & Seminar* held at the end of the project activities on "*Planning and sustainable management of coastal areas and high environmental value areas"* the major achievements were presented, and some of them are stated below:

- The establishment of two international networks between Public Administrations and Scientific institutions involved in the management of high environmental value areas;
- The preparation and publication of the INNOVA Indicator Handbook for the control and monitoring of degradation of natural resources in high environmental value areas of the Mediterranean eco-region;
- Creation of a web site (www.innovaproject.net) to get access to and interact with the computer-based platform established and implemented in the course of the project as a support to decision-making;
- A wide on-line collection, equally available and implementable on the same Internet site, containing constantly updated common guidelines for planning, management and monitoring of nature areas of the Mediterranean eco-region.

With a view to future developments and possible scenarios, the partners jointly elaborated and shared a "*Memorandum of Understanding*" for promoting long-term collaboration in sustainable management of high environmental value areas and creating a permanent consultation table between Public Administrations already involved in INNOVA project.

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INTRODUCTION

The Mediterranean Basin is one of the worldwide hotspots, which means that this area is characterized both by exceptional levels of plant endemism but at the same time by serious levels of habitat loss (Myers, 1988). Out of the 22,500 Mediterranean vascular plant species approximately 52% are endemic of the area. Moreover, the Mediterranean wetlands are of crucial importance for migratory birds in the Africa- Palaearctic flyways. The main threat for this area is the rapid urbanisation of the coastal zones which reduce the extent of natural areas. Thus, habitat fragmentation is a major problem in the area and the original vegetation only exists in small scattered patches. At present time only 4.3% of the Mediterranean Basin is covered by Protected Areas (considering all the IUCN categories), while if considering only the Protected Area designated as IUCN categories I and IV (which guarantee a higher protection compared to the other categories of protected areas) the territorial extension of the protected areas does not exceed 1.4% of the whole Basin (Conservation International, 2007). In this context, the designation of protected areas and the integration of their management with other policies is of vital importance for the maintenance of biodiversity in the Region. In order to restrain natural resources degradation and promote measures to improve the overall situation in coastal areas, since 1996, the European Commission has introduced the concept of Integrated Coastal Zone Management (ICMZ). ICZM attempts to balance the needs of development with the protection of the resources that sustain coastal economies. ICZM is based on the subsidiarity principles. For ICZM to be really effective it should not only be supported by the different levels of the administration but also involve all the relevant stakeholders.

The INNOVA project has been conceived and implemented with the main objective of *"Establishing common models of integrated sustainable monitoring, planning and management of high environmental value areas to control natural resources degradation"* in the Mediterranean Region with a special view on the ARCHIMED area (North-Eastern Mediterranean region).

Although, not directly related to Costal Area and ICZM , the output of the INNOVA project can bring several benefits to the ICZM. The application of the strategy for monitoring the sustainability in the Case Study Pilot Area has given the possibility to highlight not only weaknesses and strengths of current management, but also to define the main pressures and threats to natural resources in the ARchimed area. The lesson learned by the involvement of stakeholders and local communities in the definition of values and sustainability objectives for the protected area represent an attempt to integrate the 4 sustainability pillars in natural resources management, and promote integrated management.

The INNOVA wide Partnership, coordinated by Apulia Region, consisted of 9 Research Institutions and 5 Governmental Agencies and Institutions of 7 different Mediterranean Countries (Cyprus, Egypt, Greece, Italy, Malta, Palestine, Turkey). The Partnership was then grouped in two networks: the scientific and the administrative ones.

In the three years of the project, three International Networks Meetings (respectively on 20-22 July 2006, 29 September 2006, 17-18 December 2007 in Valenzano-Bari IT), two Trainings for technicians (the first on 26-28 February 2007 in Chania GR, the latest on 4-6 July 2007 in Valenzano-Bari IT) and several technical internal meetings were carried out conveying more than 140 participants and resulting in more than 80 presentations.

The outputs of these events are disseminated through technical-scientific documents and publications: the Indicators Handbook, the on-line Guidelines and the Proceedings.

The INNOVA Final Networks Meeting and Seminar on "*Planning and Sustainable Management of Coastal Zones and High Environmental Value Areas*" is the event completing the INNOVA Project activities.

The Final Meeting aims to bring together the representatives of both Scientific and Administrative Networks in order to share and validate the main results achieved by the INNOVA project: the Indicators' Handbook, the on-line Guidelines for planning, management and evaluation of high environmental value areas, and the final design of the INNOVA platform and website.

In conjunction with the Final Meeting, a Seminar on "Planning and Sustainable management of Coastal Zones and High Environmental Areas" is held. Such a Seminar intends to deepen the theme of Integrated Coastal Zone Management (ICZM) in the Mediterranean area as well as of high environmental values areas.

This Seminar, with the presence of highly qualified scientific and political interlocutors, intends to provide some useful hints towards understanding the topic in its general frame; its integration with the Final Meeting is intended to gather the inputs resulting from the activities performed by its Partners, as a basis for discussion. A more detailed analysis of the topics will be debated during the Mediterre 2008, the International Parks Fair scheduled from the 7th to 11th May 2008 in Bari, IT.

In this occasion the signing of a Memorandum of Understanding for the establishment of a "Permanent Consultation Table" among Public Administrations of the ARCHIMED area could represent the first step for the definition of a common strategy in the area for ICZM.

The Proceedings Volume consists of two sessions.

The first one is dedicated to the Final Networks' Meeting of INNOVA Project: its preface deals with an issue on the methodological approach of the project and then collect contributions going from the main project outcomes (such as the wide legislative analysis for all the Partners Countries, the INNOVA platform, the common Guidelines, the Indicators' Handbook) to the Pilot Project results.

The second session is dedicated to the Seminar on "*Planning and Sustainable Management of Coastal Zones and High Environmental Areas*": in this part the welcome addresses of the Authorities are presented, followed by 11 contributions devoted to the environmental as well as the economic issues related to the coastal areas.

The implementation of integrated coastal zone management is a slow and long-term process, which is still in the early stages. We really hope this event, stimulating fruitful dialogue among Scientist, Public Administrations, Regional and National Government Bodies in such a crucial theme, could represent the start up of the establishment of wide cooperation within Mediterranean Countries in defining a common strategy in the area for ICZM.

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Fabrizia Buono
Fabrizio Contento
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CONCEPT NOTE
THE MANAGEMENT OF ENVIRONMENTALLY HIGH-VALUE AREAS IN THE MEDITERRANEAN COASTAL ZONES: THE PROJECT INNOVA AND ITS RELEVANCE IN THE CONTEXT OF THE EU STRATEGIES

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Coastal zones are considered to be an important driver of economic and social growth in many regions. They constitute a necessary focus for numerous activities and aspects ranging from social and cultural values to economic and environmental ones. The simultaneous co-existence of social, economic and environmental elements and pressures, makes the coastal areas the most favourable territorial laboratory to apply concepts of integrated management enhancing sustainable development and the governance of areas having a high environmental value (i.e.: national protected areas, and IUCN classified areas, etc.). The environmental value of some coastal areas, like the Mediterranean coast, is highly significant but often these are highly vulnerable areas. Many local, national or regional administrations are demanded to develop effective policies and take protection measures or provide international rules and guidelines to classify areas on the basis of their socio-cultural, economic and environmental values and capital(1).

The accumulation of stress factors is considerable in costal zones and consequently places at risk the high environmental capital of areas included in these zones. Holiday home urbanisation, illegal building up in coastal areas, land-based pollution (which accounts for 80% of total marine pollution), waste generation, the extraction of sand and water, the poor management of catchments, certain leisure activities, fishing and aquaculture practices and invasion of exogenous species, are all resulting in a spiral of degradation of the whole coastal zone, particularly of environmental high-value areas. This is leading to the deterioration of the landscape, cultural heritage, living standards, as well as to water invasion and costal erosion, destruction of sand dunes, wetlands and biodiversity. The human and economic costs, which include the loss of local jobs, are for instance increasing as a result of the over-exploitation of fish resources.

Generalised deterioration accompanied by exacerbating urbanisation (against rural activities) provokes local and regional conflicts within the coastal zones, particularly in protected environmental high-value areas, where conflicts between inners and outsiders are triggered by rules and constraints (given by protection measures) on the access to and use of local resources.

Although representing only 0.7% of the earth's ocean surface, the Mediterranean Sea carries 30% of the world's maritime traffic. Pollution from ships is mainly of an “operational” nature, including illegal oil discharges and ballast water. However, the risk of accidents remains high, despite prevention policies. It is necessary to forestall these trends. Without policy changes, vast inter-connected urban areas will develop in coastal regions and nearly 50% of the 46,000 km of Mediterranean coastline may be built up by 2025, compared with about 40% in 2000. There may well be a considerable rise in the costs of environmental degradation and vulnerability to hazards, such as flooding, tsunami and maritime pollution. There is also the risk of a growing disparity of responses between current and future EU Member States and other countries(2). Within this possible scenario, environmental high-value areas will be more and more limited and devastated if no sustainable strategy for "integrated" coastal area management is seriously taken up in future EU research and development agendas and programmes.

The concept that coastal environment and communities warrant special consideration in planning and development achieved international recognition following the UN Earth Summit (Rio de Janeiro) in 1992. During the 1990s the European Commission embraced Integrated Coastal Zone Management (ICZM) as an area requiring co-ordinated European action given the coast's critical situation and in the belief that many of the problems have a "European Dimension".

As early as 1992 the European Council issued a Resolution (OJ C59, 06.03.92) highlighting the need for a community strategy for integrated planning and management of coastal zones.

A recommendation of May 2006 requires Member States to present in 2006 the final national stocktaking exercise, identifying all the main actors, laws and institutions involved in national ICZM strategy.

Interesting suggestions have come from the ongoing European discourse, particularly the Brussels Seminar of 1999 "Toward a European Union Strategy for Integrated Coastal Zone Management" where reference has been made to the geographical diversity of Europe's coasts and to the diverse nature of the represented interests resulting in the fact that concerns of managers and decision makers are not necessarily homogeneous.

It is then important to adequately allocate resources and make better use of diversity. The integrated management process aims at restricting overlapping practices and particularly the overlapping of policies at EU and national level. There is a strong need today to bring local authorities and local actors into the process and to ensure that at the various levels concerned, decisions are made in an integrated manner and are aligned with the most acknowledged criteria or imperative of sustainability[(3)].

The need for integration is not confined to coastal zones, coastal vs. catchment planning, and environmental high-value areas are a dynamic part of overall planning. Referring to the ESDP (European Spatial Development Perspective) it is worth noting that Coastal Area Management goes beyond the Community instruments and needs to be encompassed by Intergovernmental and International agreements.

Moreover, in the framework of the Structural Funds regulations, Member States had agreed that planning remains within Member State competence. It is up to the Member States and Regional Administrations to consider the need for integration. Referring to INTERREG which involves the transnational/regional dimension in co-operation Programmes, this programme adopted by the Commission deals with several transnational zones including the maritime and coastal zone, and provision is made for integrated actions.

At the EU programme level today, the 7th Framework Programme for Research and Development acknowledge the European Council Resolution (OJ C59, 06.03.92). The Thematic Priority Environment, and sub-theme "Conservation and sustainable management of natural and man-made resources and biodiversity" included topics of high relevance in the EU policy agenda, i.e. those contributing to the environmental policies, such as the 6th Environmental Action Plan, the related Thematic Strategies and several important initiatives such as the Water Framework Directive, the EU ICZM (Integrated Coastal Zone Management) and NATURA 2000. Theses sub-themes published and will still publish calls for research - scientific proposals for projects with a true European dimension and relevance aimed at developing innovative approaches to crucial issues, addressing the broad range of environmental, economic, institutional and ecological conditions encountered in Europe, gathering multidisciplinary research teams with the objective of developing unifying concepts and models that could later be implemented at community, national and regional levels for the protection and the management of natural resources within the context of climate change[(4)].

In consequence of the positive momentum over the last 15 years and the high political interest, several national and international projects and research activities have been carried out on coastal area management, ranging from ecosystem and environmental studies to social, economic and institutional ones. In spite of many efforts, the literature lacks a consistent overview. We still lack the results of relevant and significant challenges in correctly enhancing spatial, sector and cultural integration in coastal area management. Although studies have been centred on the integration at local, district and catchment levels, the existing literature has proved the current limits in up-scaling the concept of integrated coastal management. Moreover, operating the interlinkage with criteria of sustainability and governance and launching a comprehensive participatory management process are still far from being achieved.

The project INNOVA was established in the frame of the INTERREG Programme "ARCHIMED" and it aims at contributing to the management and sustainable development of coastal zones. Although INNOVA is not directly centred on coastal areas management, it deals with protection and development of environmentally high-value areas, which are mainly located in the Mediterranean coastal region and are of great interest for their social, economic and environmental capitals. The main objective of INNOVA is to improve sustainable management of high environmental value areas, through the adoption of common guidelines of monitoring, planning and management of the

Mediterranean eco-region. A basic element of the project has been the creation of international networks of political-administrative and scientific agencies responsible for the management of environmentally high-value areas. The main result of INNOVA consists in common regional "Mediterranean Guidelines" built along a local and regional participatory process and inspired by strong concepts of sustainability and governance.

INNOVA has then established an open regional dialogue in the Mediterranean among institutions involved in the management of environmentally high-value areas (including protected areas), stakeholders and researchers. As a result of this dialogue a number of social, economic, environmental and institutional goals (sustainability goals) and indicators have been identified and they can certainly constitute an important base for further EU research activities in the area of integrated coastal management.

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SESSION 1

FINAL NETWORKS' MEETING OF INNOVA PROJECT

THE INNOVA VISION MONITORING, PLANNING AND MANAGEMENT OF HIGH ENVIRONMENTAL VALUE AREAS

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PREAMBLE

From the very beginning, INNOVA project has relied upon two cornerstones: a participatory approach implemented at various levels of the management process (from the local to the national scale) and sustainability as a prerequisite for the management of High Environmental Value Areas.

The participatory approach was initially applied through the establishment of the two Networks (scientific and administrative) consisting of the representatives of the various countries involved and subsequently implemented through pilot projects activities: the stakeholders, who are daily involved in the effects of Protected Areas management, were allowed to express their view on the potentials of these areas and the threats to their survival; the local communities, who directly expressed their views on the extent of their involvement in the decision-making processes, on the quality of the Protected Area management and on the effects of the latter on the life of the community.

A further innovatory aspect of the Project consisted in setting the management of High Environmental Value Areas (HEVAs) in the wider frame of sustainability[1], systematizing the different aspects related to the management of natural, cultural and territorial resources, with respect to the sustainability dimensions (Environmental, Economic, Social, Governance) and their interlinkage.

The sustainability framework has been the underlying theme of the numerous and subsequent steps of the project, from the identification of the general objectives to the definition and choice of the set of indicators and the elaboration of common guidelines.

The following Vision Document, faithfully rendered as it was produced after the Kick-off Meeting and the 1st Network Meeting held in Bari on 20-22 July 2006, proposes the methodological approach adopted in INNOVA Project, the visual devices used to facilitate working group activities with the Partners (Annex I) and the results of the prioritisation of concerns (reported in Annex II).

Though the Project has oftentimes been subject to some adaptations in the time-frame and definition of outcomes and deliverables, it has remained basically faithful to the theoretical contents of this document.

INTRODUCTION

Based on the analysis of the existing degradation of natural and cultural resources of the Mediterranean area, INNOVA project is aimed at identifying and sharing new modes for monitoring, planning and managing High Environmental Value Areas (HEVA) in the framework of cooperation and exchange between the countries of ARCHIMED area.

The basic assumption of the project is that in these areas the same as in all the remaining Mediterranean territory resources are often used in a diversified and sometimes conflicting way, which makes them real “arenas” where concrete attempts for sustainable management are made. Therefore, the problems related to the management of natural and cultural resources should be analysed in the framework of sustainability and of the pillars on which it is based.

[1] The sustainability notion we refer to is the one proposed by the Bruntland report (1987) that defines it as *“development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”*

After a short description of these problems in the Mediterranean area, the path to define the objectives and the deliverables of the INNOVA project is illustrated, setting them in the framework of sustainability.

In the course of the 1st meeting of the Networks, it was attempted to bring to light the concerns of each single Country and, in particular, the priorities shared within the ARCHIMED space that can be useful for subsequent reflections and elaborations.

Based on the wide discussion about the definition of HEVAs and considering the need to achieve a common vision of the project areas, in this document a possible solution to this question is proposed.

Should the methodological and operational assumptions reported in this Vision Document be shared, they will constitute the basic principles upon which our common path will be constructed.

METHODOLOGICAL BACKGROUND

The Mediterranean basin, which should be considered as a single eco-region, is historically subject to degradation of natural and cultural resources. The study of these problems in such a territorial context has inevitably to take into account its peculiarities and characteristic features. This territory was the cradle of civilization and it has experienced/gone through the actions and activities of humans for centuries.

In a sense, the Mediterranean landscape, as affected by its geo-climatic characteristics, has co-evolved with the action of man so much so to risk degradation both because of excessive anthropic pressure and of its absence (refer, for instance, to impressive water erosion caused by the abandonment of traditional land management techniques on sloping lands practiced in southern Italy, in Malta, and Greece, etc.). On the other hand, in the last decades anthropogenic pressures on resources and the territory have increased and intensified and it becomes increasingly difficult to identify areas that are not directly and/or indirectly affected by such a pressure. The approach required to study natural/cultural resources and the management of high environmental value areas cannot disregard considering their continuous interaction with the anthropogenic component.

Referring to the experience of Italy, for instance, it is not by chance that it has abandoned the concept of protected areas as “island” to be managed exclusively for nature and biodiversity conservation purposes to accompany it by socio-economic development objectives based on local resources and traditional economy.

On the other hand, such an approach[2] was inevitable in a territorial context, common to many Mediterranean countries, where agricultural and rural areas, though being highly compromised in their original naturalness, play a major role as reservoirs of agro-biodiversity, traditions and local culture and represent landscapes to be preserved and enhanced.

Within such a framework, resource degradation-related problems require an integrated and holistic approach. Referring, for instance, to soil degradation, we should keep in mind that it is due to both ***physical causes*** (aggressiveness of Mediterranean climate, with dry summers and intense rainfall during winter time; steepness aspects; pedological features, with different erodibility soils) and ***anthropic causes*** (not sustainable agriculture causing salinization, pollution, overgrazing, mechanization; unfeasible practices for physical and socio-economic context; urbanization; loss of fertile soil of natural areas or agricultural land due to soil sealing and urban sprawl; water and wind erosion; loss of fertility).

The same remarks can apply to degradation of water resources and other natural/cultural resources.

To define the objectives of the INNOVA project, we started by arranging the causes and effects of resources degradation in a hierarchy based on the “Problem tree” approach (Fig. 1).

[2] Also the new programming of the common agricultural policy (2007-2013) and rural development policy focus on integrating environmental problems with production development ones.

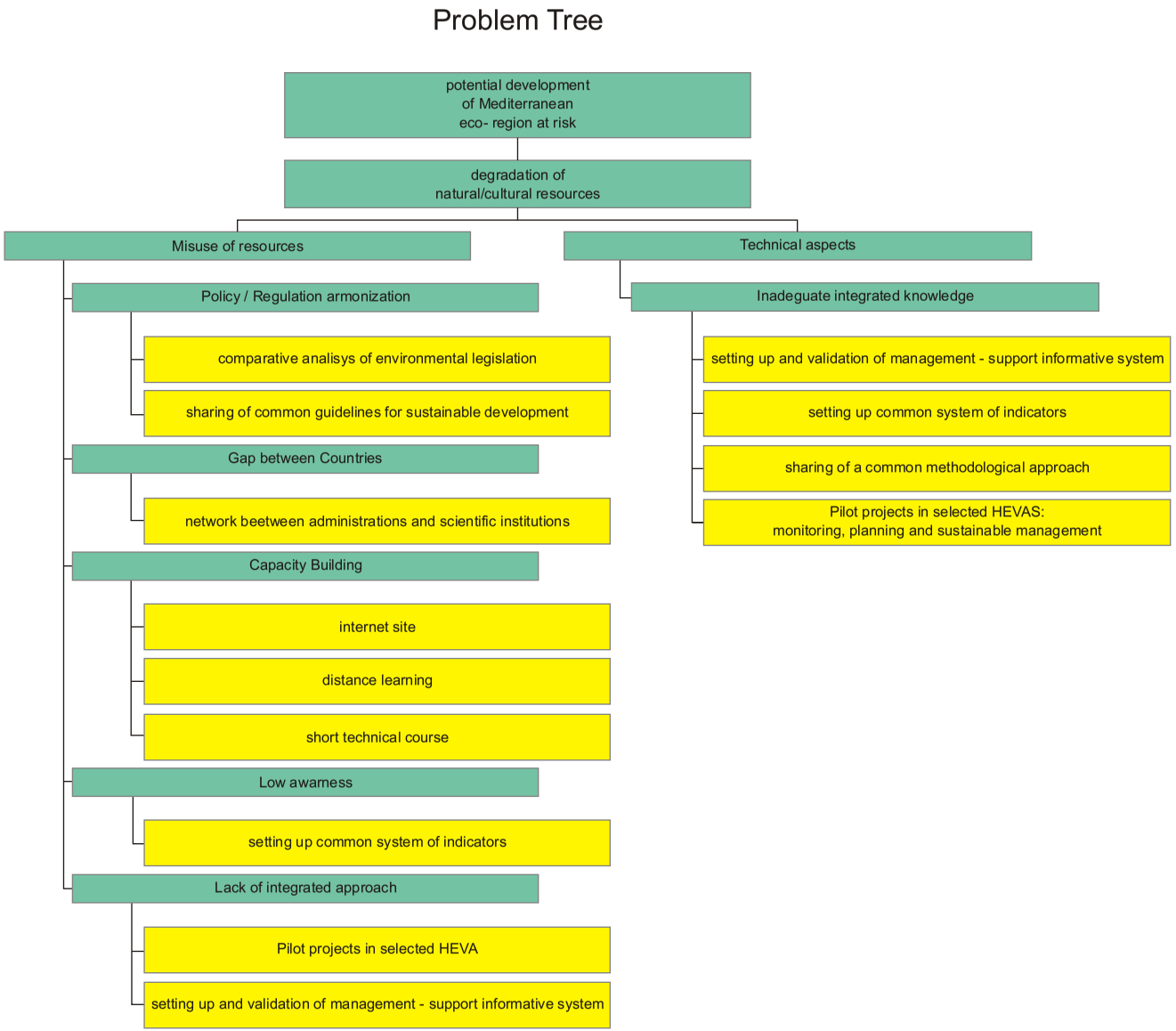


Fig. 1. “Problem tree” applied to the natural/cultural resources caused by human action

This chart shows that, within the framework of human activities, the problems related to the "degradation of natural/cultural resources" are basically due to the misuse of resources and to technical aspects caused by a sectorial approach to management.

The Figure above gives an exploded view of the previous chart, where each problem corresponds to one or several measures and actions scheduled in the project.

Such measures represent, on one hand, some possible responses to the identified problems[3] and, on the other hand, constitute the main deliverables of the project.

Without detailing the project approach and its deliverables (the general project flowchart is shown in Fig. 2), it is enough to refer to the few pieces of information provided so far are quite enough to define the approach, as it is already disclosed in the title: "*Establishing common models of integrated sustainable monitoring, planning and management of high environmental areas to control natural resources degradation*" (INNOVA).

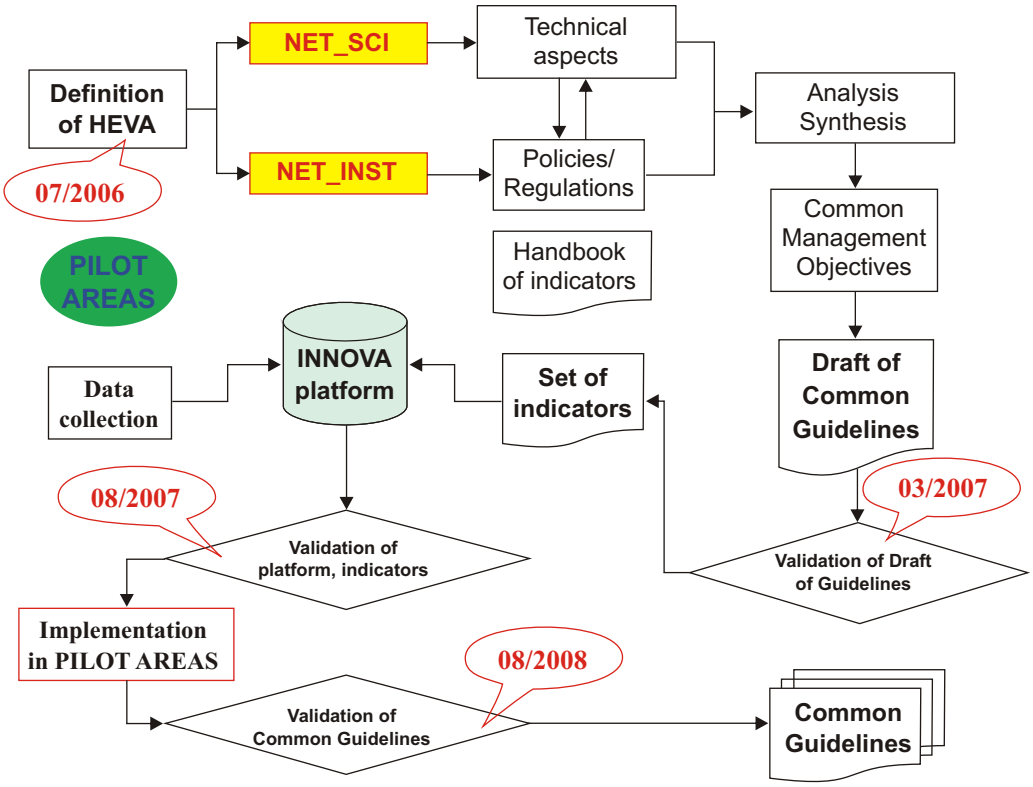


Fig. 2. Flowchart of INNOVA Project

The project is not intended to have a sectorial approach but rather an integrated one, thereby being closely related to sustainability. The innovatory aspect of INNOVA project is to place the management of High Environmental Value Areas (HEVAs) within the wider framework of sustainability that embraces the management problems of the whole Mediterranean area.

We refer to the concept of sustainability as introduced by Bruntland Report (1987) where it is defined as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

An additional feature of the project is its participatory approach; the basic option is an exchange of views between the representatives of the different Countries, allowing them to express their ideas about fundamental questions of the whole project. This approach, based on the involvement of all and on sharing the most outstanding choices that pervade the whole project, is the key for the two Networks to operate.

[3] Policy/regulation harmonization, gap among Countries, capacity building, low awareness, lack of integrated approach are the main causes for misuse of resources; the inadequate integrated knowledge is the principal cause of mistakes in the management of technical aspects.

The 1st Meeting of Networks starts from such methodological and operational premises and places the problem of management of natural and cultural resources, threatened by degradation, in the perspective of sustainability and its supporting pillars.

The Sustainability triangle (Fig. 3) represents, in the simplification introduced by Valentin and Spangenberg (2000), the three dimensions of sustainability (Economic, Social, Environmental) and the inter-linkages between them (Access, Burden sharing, Eco-Efficiency).

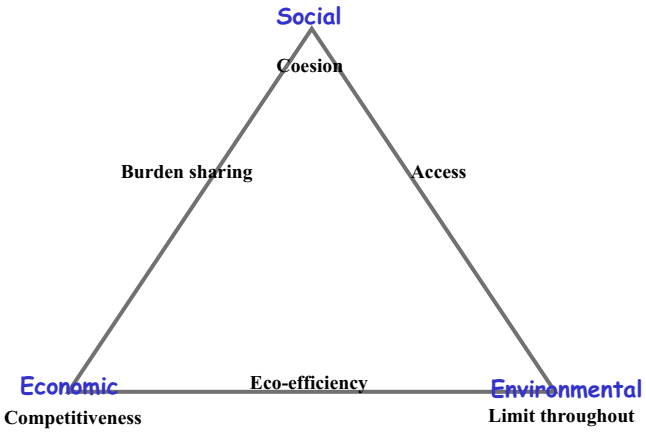


Fig. 3. The Sustainability Triangle

Here we shortly define the three dimensions and the corresponding mutual inter-linkages whereas, referring to the abundant literature on this topic as for the detailed theoretical description of such visual device:

- **Social** (cohesion): a mixture of human capital, advancement of the social structures and "cohesion", bottom up participation in decision-making process, improvement of the quality of life and social security;
- **Economic** (competitiveness): enhancement of the economic bases of production, job security and job safety, food security and quality; increase of production at all levels;
- **Environmental** (limit throughout): protection of natural resources, maintenance of productivity, reduction of the environmental degradation and of the impact of the ecosystems caused by human activities; conservation of biodiversity;
- **Burden sharing** (Social vs. Economic): the sharing of burden as well as benefits linked to sustainable management of resources needs to be equally distributed;
- **Eco-efficiency** (Economic vs. Environmental): improve resources productivity/infrastructure performance reducing environmental impact is a way to enhance efficiency;
- **Access** (Environmental vs. Social): is related to "the human right to resources access" as well as access to knowledge and technologies for the management.

The existing links between the above-mentioned dimension and the institutional one (in our case we define it as Governance) are reported in Fig. 4.

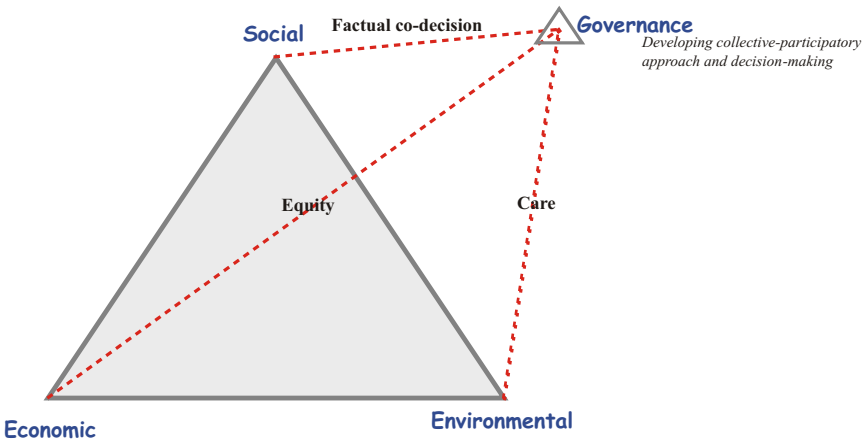


Fig. 4. The Sustainability Triangle and the Governance dimension: pillars and inter-linkages

Such inter-linkages are defined as follows:

- **Factual co-decision** (Social vs. Governance): participation is a condition for democracy (in general term) as well as to improve social cohesion and awareness on management problems;
- **Equity** (Economic vs. Governance): is linked to an equal distribution of resources leading to a collective growth and social wellness;
- **Care** (Environmental vs. Governance): used to describe a combination of dedication and action, normative/regulation and individual way of life aimed at the environmental protection.

The Governance triangle (Fig. 5), in turn, is defined by three dimensions (Bogliotti & Spangemberg, 2005):

- **Knowledge**: is based on trans-disciplinary help (from technical to economic, social and humanistic sciences) to support problem resolution in a holistic approach;
- **Capacity**: it depends on the quality of collaboration, communication, reciprocal understanding and participation of the people/institution to the governance process;
- **Critical mass**: it is based on integration of knowledge and integration of people (stakeholders and Institution) who co-act to the planning/management process.

Also the existing inter-linkages have to be considered:

- **Preventive planning** (Knowledge vs. Capacity): this is based on well-shared knowledge to develop creative planning to mitigate unforeseen effects on system;
- **Diversity in communication** (Critical mass vs. Knowledge): this linkage is based on the involvement of high diversity and equity to access to knowledge through the empowerment of participation;
- **Diversity in planning/management** (Capacity vs. Critical mass): this is addressed to strengthening the societal participation in planning and management.

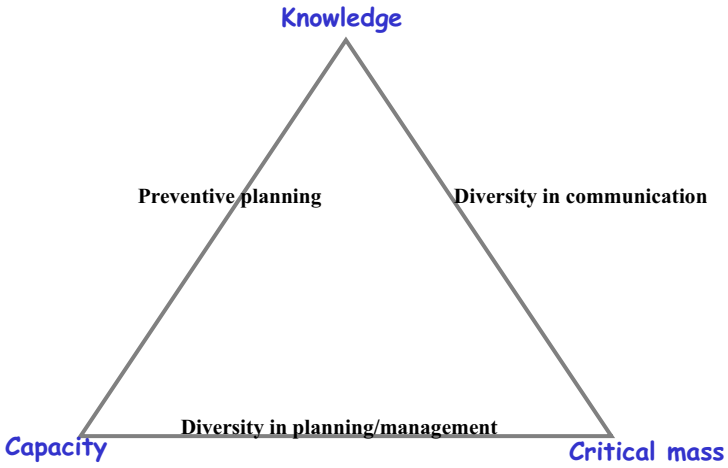


Fig. 5. The Governance Triangle

Though these charts used in the working groups simplify a very complex and multidimensional reality, they can greatly help in considering and systematizing the different critical aspects relative to the sustainable management of natural and cultural resources and the territory where they are located. They are used within the INNOVA project to assess whether national regulations and management criteria of High Environmental Value Areas take into account the principles of sustainability and how the integration of the latter could possibly be improved.

Moreover, such devices could help defining common management criteria and indicators that describe their implementation within the pilot areas to achieve the desired targets.

ACTIVITIES OF THE WORKING GROUP

After a short presentation by Dr Claudio Bogliotti to illustrate the purposes of the working group, the use of the working tools was illustrated:

- The Sustainability triangle,
- The Sustainability Vs. Governance triangle
- The Governance triangle.

Initially, the work had been organized in such a way to allow the two Networks (technical-scientific and institutional) to work in parallel to expand on the outstanding features closer to their own competences. The technical-scientific Network was intended to search into the dimension of Sustainability and its relationships with Governance; whereas the institutional Network was intended to analyze the dimension of Governance[4].

Because of the few institutional partners attending the meeting, it was agreed that as far as the Kick-Off Meeting was concerned, the two Networks could work jointly and, accordingly, they debated about the aspects relative to the first two visual devices (the Sustainability triangle and inter-linkages with Governance).

The work carried out by those present was aimed at identifying, for each pillar and for each inter-linkage and starting from the main awkward aspects (or presumably so), adequate concerns that could improve the management of natural/cultural resources.

The work was performed following Metaplan methodology (slightly modified) (W. & E. Schnelle, 1973):

1. Give the rationale and the objective of the work
2. Write personal ideas/concerns on cards
3. Pin-up cards on prepared boards with sustainability and sustainability vs. governance pillars/inter-linkages
4. Prioritisation by voting using coloured markers (red = high priority, yellow = medium priority, green = low priority)
5. Presentation of results on plenary group, discussion and conclusion

To make the working group more successful, animators proposed some possible concerns (**Annex I**); the group was asked to continue such exercise by proposing exercises and/or amendments on the basis of the experience of the respective Country of origin.

The participants were also asked to prepare the draft list of concerns following a priority scale: this result was obtained by asking the representatives of each Country to attribute a different level of importance (high, medium, low) to each concern using a colour (red, yellow, green).

Since this hierarchization was made by each scientist/administrator, is doesn't mean to represent the official position of each Country. Despite some degree of subjectivity, the results obtained can usefully contribute to thinking about and understanding the national peculiarities.

Here we propose a preliminary analysis of the results achieved in the WG works.

First, a list is given of the integration proposals to the concerns presented in the plenary session held on July 21.

SOCIAL - cohesion

- Generate new systems of effective public participation in HEVAs
- Respect for legality
- Cohesion may be coercive (use social equity)
- Access to research for all but research limited to researchers only.

ECONOMIC - competitiveness

- Refrain from using competitiveness (best eco-efficiency/feasibility)

ENVIRONMENTAL - limit throughout

- Improve environmental awareness Environmental education
- Save biodiversity using traditional activities
- Create database of species biodiversity
- Improve monitoring methods
- Save biodiversity using flora and fauna

Burden sharing (SOCIAL - ECONOMIC)
- Incentives for farmers who live in protected areas
- Cost of damage to do it

Access (SOCIAL - ENVIRONMENTAL)
- Limited information tools to design-manage HEVAs
- Ensure access to low impact technologies in agriculture
- Address problem of small powerful lobbies having disproportionate influences on policies in HEVAs (e.g.: Hunters)

Eco-Efficiency (ENVIRONMENTAL-ECONOMIC)
- Understand the benefits of shifting to eco-tourism from local stakeholders
- Foster income generating activities within impacts
- Improve innovation

Factual Co-Decision
- Move away from hearings to participation
- Taking into account public participation in planning (level)

Others
- Gap between theoretical model and project goals
- Simple structure for common needs and tools easily applicable

As for the hierarchization exercise of concerns, the final result - consisting in an orderly list - was reported in annex (**Annex II**).

Within the dimension of sustainability, great importance was recognized to some concerns: first of all the aspects of “Save biodiversity using indigenous plant” and “Education/dissemination of best practices with low environmental impact” that refer to the environmental dimension.

High priority was also assigned to the concerns relative to “increase system income through the market of local product” (economic dimension), “improving water productivity and water use efficiency” and “creative models of minimal use of resources against increase of productivity” (Eco-efficiency).

Many other concerns were identified as priority though shared to a lesser extent.

Equally significant can be the reading of the matrix on the basis of the choices made by each single country, to highlight similarities and differences in the scale of nation-wide priorities. We notice, for instance, the importance Malta attributes to the social aspects or the importance Greece or Libya attribute to environmental aspects. On the other hand, as compared with other countries, Italy attributes less importance to social and economic aspects focusing, within each of the abovementioned dimensions, only on single concerns among the ones proposed (e.g. “Improve stability of farmers in HEVAs” among social aspects and “Investment in training” among economic ones).

A difference is also observed in the scale of priorities assigned to the concerns between EU countries and non-EU countries: the latter generally attribute greater importance to the Economic (e.g. “Increase system GDP”), Environmental (“Save biodiversity using indigenous plant”), Access (“Ensure access to the use of resources”) and Eco-efficiency (“Improving water productivity and WUE” and “Creative models of minimal use of resources against increase of productivity”) aspects.

A similar approach can be used when referring to the relationships between the dimensions of Sustainability and Governance. It is observed that most of participating countries attributed high priority to the aspects related to Co-decision (Social-Governance) and Care (Environmental Governance); in particular, “Improve participation into research” and “Increase environmental awareness in different social sectors” are the two issues considered to be of greater importance. On the other hand, few countries thought it was important to “Improve investments in public hearings” and this choice contradicts the common will to increase the participation level.

Undoubtedly, the failure of the Institutional Network to contribute and, accordingly, neglecting the aspects of Governance, prevented going into them more thoroughly, but we hope to do that soon.

Nevertheless, this preliminary exercise has clearly given interesting cues for a subsequent debate; one should not forget that the two Networks will have the chance to reconsider both the concerns and

the judgements they expressed.

Here, two of the major aspects discussed during the Networks and that are fundamental for the continuation of the project activities have to be defined quite clearly:

- What do we mean by HEVAs?
- Is HEVAs management the same as in other territories? If not, what's the difference?

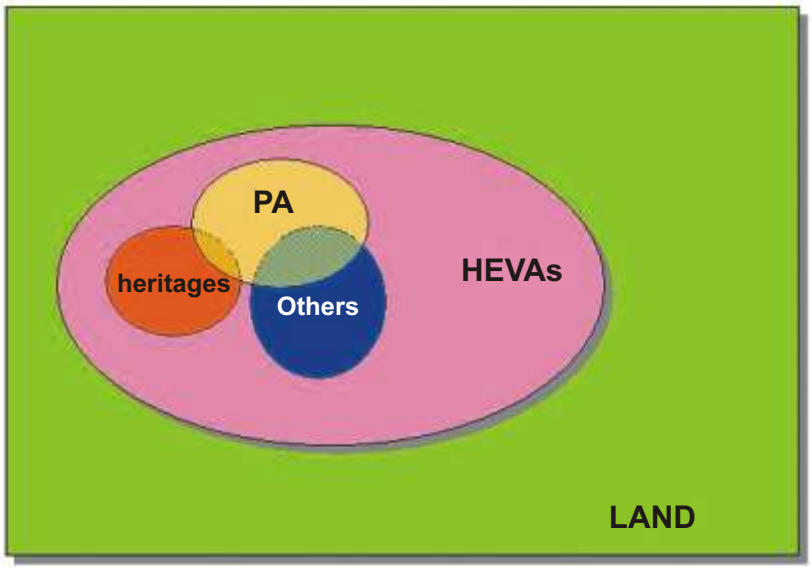
Concerning the first question, as previously stressed, this was the main topic of debate in the course of the 1st Meeting of Networks.

National legislations include various types of areas subject to different preservation regimes and many of them can be defined to be “of high environmental value” in that they have natural, cultural and landscape resources of special or high value and/or such resources are in some way threatened with degradation.

Many of the protected areas fall within the HEVAs typology but, in fact, not all of HEVAs are under preservation regime. Nevertheless, a precise definition of such areas is still lacking and this might involve some subjectivity in identifying the subject of the research and indubitable operational problems in carrying out the tasks of the project.

From the debate it came to light that, for many partner countries, HEVAs basically coincide with Protected Areas (PA).

Indeed, this is not considered to be entirely correct. To give an example, we might consider HEVAs as a wide set including areas subject to different protection regimes (protected areas, coastal areas, wetlands, watercourses, natural/cultural monuments, etc.) as well as areas with no protection whatsoever (Fig. 6).



HEVAs = High Environmental Value Areas
PA = Protected Areas
Others = areas under protection for different purposes
Heritages = cultural resources

Fig. 6. An example of overlaying between different types of areas

In view of the difficulty to define the container (the HEVAs), it could be advisable to focus on the Protected Areas as a common and univocally definable element between the different Countries.

Among the different typologies of PA (Table 1 and Table 2), for the purposes of the project, it will be appropriate to consider more carefully the Protected area managed mainly for the sustainable use of natural resources that are thus established to *“Provide benefits to local and national economies and as models for sustainable development to be applied elsewhere”* (IUCN, 1994).

Table 1. IUCN Management Categories for Protected Area (IUCN, 1994)

IUCN Categories	Definition	Description
I	*Strict Nature Reserve/Wilderness Area*	Protected area managed mainly for science or wilderness protection
II	*National Park*	Protected area managed mainly for ecosystem protection and recreation
III	*Natural Monument/Natural Landmark*	Protected area managed mainly for conservation of a specific natural features
IV	*Habitat and Species Management Area*	Protected area mainly for conservation through management intervention
V	*Protected Landscape/Seascape*	Protected area managed mainly for Landscape/Seascape protection and recreation
VI	*Managed Resource Protected Area*	Protected area managed mainly for the sustainable use of natural resources

Table 2. Purposes for Protected Area (according to the World Congress on National Parks and Protected Areas - NCPPA)

Purposes for Protected Areas
1) Safeguard the world's outstanding areas of living richness, natural beauty and cultural significance as a source of inspiration and an irreplaceable asset;
2) Maintain the life-supporting diversity of ecosystems, species, genetic varieties, and ecological processes;
3) Protect genetic variation and species which are needed to meet human needs, e.g., in food and medicine;
4) Provide homes to human communities with traditional cultures and knowledge of nature;
5) Protect landscapes reflecting a history of human interaction with the environment;
6) Provide for scientific, educational, recreational and spiritual needs of societies;
7) Provide benefits to local and national economies and to be used as models for sustainable development to be applied elsewhere.

In this perspective, Protected Areas could be considered as "laboratories" where forms of sustainable management could be tested and the good practices of which can be exported to the neighbouring territory. Equally, they constitute territories where attempts could be made to reconcile conflicts between different needs (environmental, social, economic, and institutional).

This vision fully tunes in with the statement issued upon the "Conference on Protected Areas in the Mediterranean Context. Reinforcing Regional Initiatives and Partnerships for the Rational Use of Natural Areas" (Murcia, Spain, 26-30 March 2003):

"For the establishment of an eco-regional framework, it is necessary to see the Mediterranean as a highly ecologically heterogeneous territory, subjected to different turnovers and interconnected at the different temporal and spatial scales. In this context, ***protected areas*** *- characterized by their multifunctional character - are not target of conservation but tools for assembling sectorial policies. Furthermore, protected areas are bridges, facilitating the shift from sectorial and compartmented to global and holistic territorial management approach."*

This choice is corroborated by other motivations:

1.they can be easily identified on the territory;
2. they have a well defined legal status sanctioned by the legislations of the different countries;
3. In general, more territorial data are available and facilitate the implementation of the platform and of the system of indicators;
4. they have specific management rules that should meet the sustainability criteria.

As for the management of these areas, it is stressed that in the course of the Meeting, though this topic was repeatedly tackled by several countries, it was never explicitly at the centre of the discussion. Management aspects are however essential for the project since one peculiarity of INNOVA is that it provides criteria for the governance of HEVAs in the framework of sustainability.

This framework, considered to be applicable to any area and territory, is certainly useful both for the management of HEVAs and of PA. We can right now state that the only difference characterizing these areas with respect to the remaining territory concerns the objectives of sustainability underpinning their management.

Schematically, (Fig. 7) an area managed in a sustainable manner should be set in the middle of the triangle, but in the case of PA the *objective-position* probably shifts towards the environmental dimension.

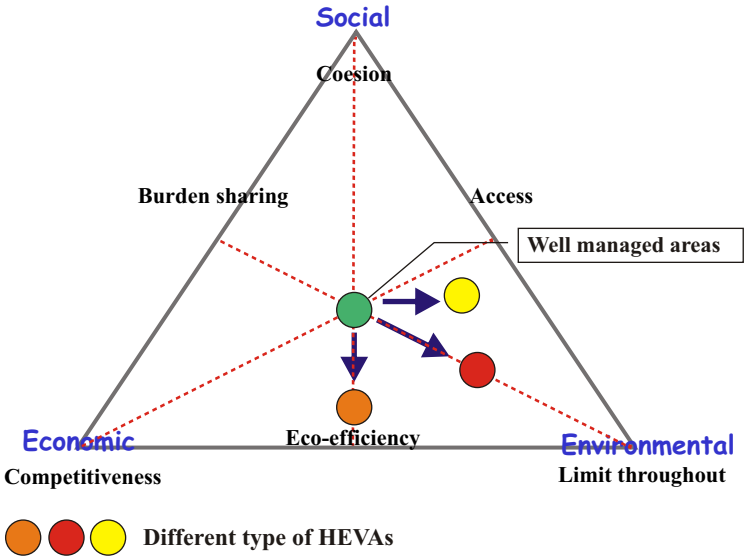


Fig. 7. How the management criteria influence the position of HEVAs in the Sustainability context

It is desirable to share the definition of the objective-position, which is the reflection of the management lines established for the area, on the basis of the specific characteristics of HEVAs and of the territory where they are located.

This subject is simply outlined here but will be further illustrated in the course of the project.

CONCLUSIONS

During the Kick-Off Meeting and the 1st Meeting of Networks (Bari, 20-22 July 2006) it was decided to adopt a participatory approach, which the INNOVA project will however apply in continuing the activities. Undoubtedly, such a methodological approach initially presents more difficulties in defining the choices but once the latter are taken, since they stem from a process of concerted action and sharing, they are “the best among the possible ones”. Basically, it is thought that the participatory method, bristled with difficulties, is however the most efficient one to achieve shared results for the whole Mediterranean area. Therefore, special attention will be given to the involvement of Third Countries, at every phase of the project, despite the financial constraints imposed by ARCHIMED program.

The other focal point of the methodology chosen by INNOVA and shared by the Partnership is the use of the framework of sustainability for situating the problems of resources degradation and defining the priorities in the management of HEVAs.

Sustainability will be the framework within which the various subsequent steps of the project will be faced. This is the case, for instance, of the elaboration of the common guidelines, as well as the definition and choice of indicators.

A further consideration resulting from the Meeting refers to the definition of HEVAs: in the absence of a univocal definition of such areas, the Lead Partner and the MAIB propose to refer, whenever possible, to protected areas already recognized (according to the definition provided by the IUCN - 1994). In this perspective, Protected areas will be considered as a "laboratory" to test innovatory planning, monitoring and sustainable management models useful to define the common guidelines in the Mediterranean.

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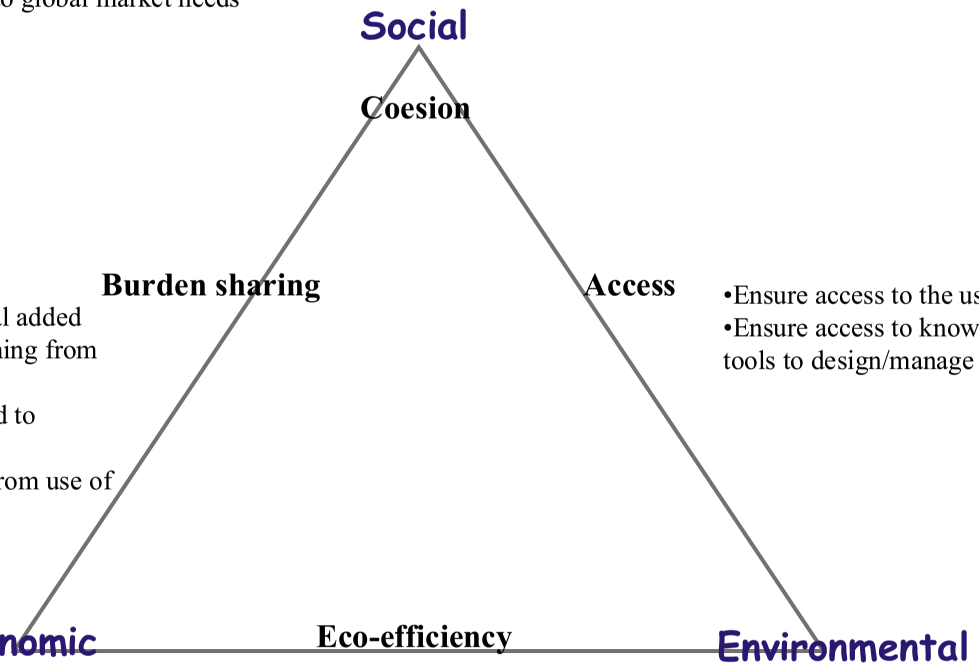
ANNEXES

ANNEX I Visual devices for Working Group

ANNEX II Sustainability matrix

ANNEX I - Visual devices for Working Group (1/3)

•Improve stability of farmer in HEVA
•Safeguard cultural heritage
•Reallocation of resources to mitigate potential conflicts
•Improve employment rate through HEVAs resources
•Adapt traditional crops to global market needs



•Societal redistribution of potential added value (financial/non tangible) coming from adoption of HEVA
•Collective sharing of costs related to degradation control
•Distribution of benefits coming from use of heritage/cultural resources

•Ensure access to the use of resources
•Ensure access to knowledge, information tools to design/manage HEVAs

•Increase system income through the marketing of local products
•Investment in training
•Improve transportation network
•Improve public infrastructures
•Increase system GDP

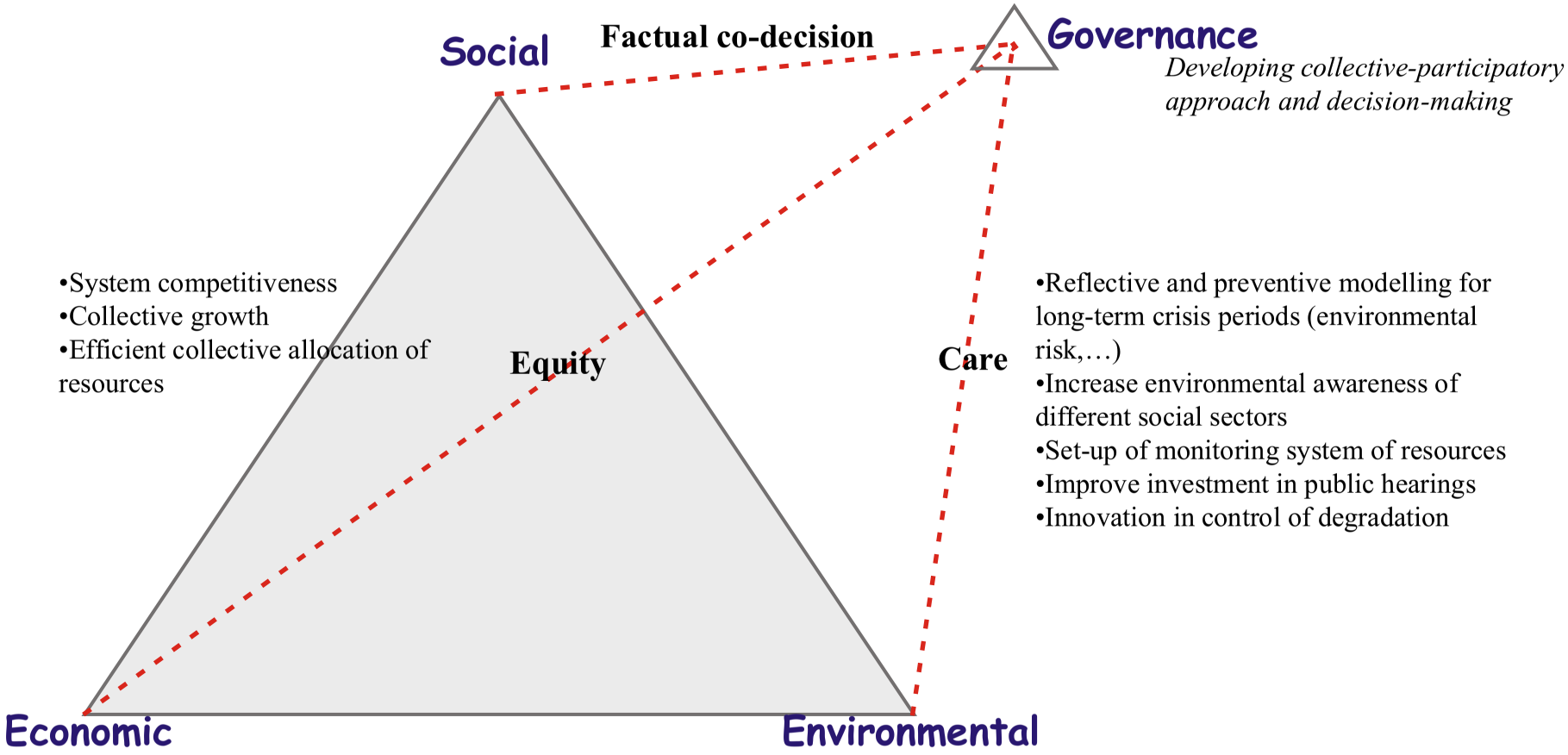
•Improving water productivity and water use efficiency
•Creative models of minimal use of resources against increase of productivity
•Improve infrastructure performance
•Control of total material requirement in increasing resources productivity

•Building scenario to enhance management/risk mitigation
•Education/dissemination re: best practices with low environmental impact
•Save biodiversity using indigenous plant

SUSTAINABILITY TRIANGLE

ANNEX I - Visual devices for Working Group (2/3)

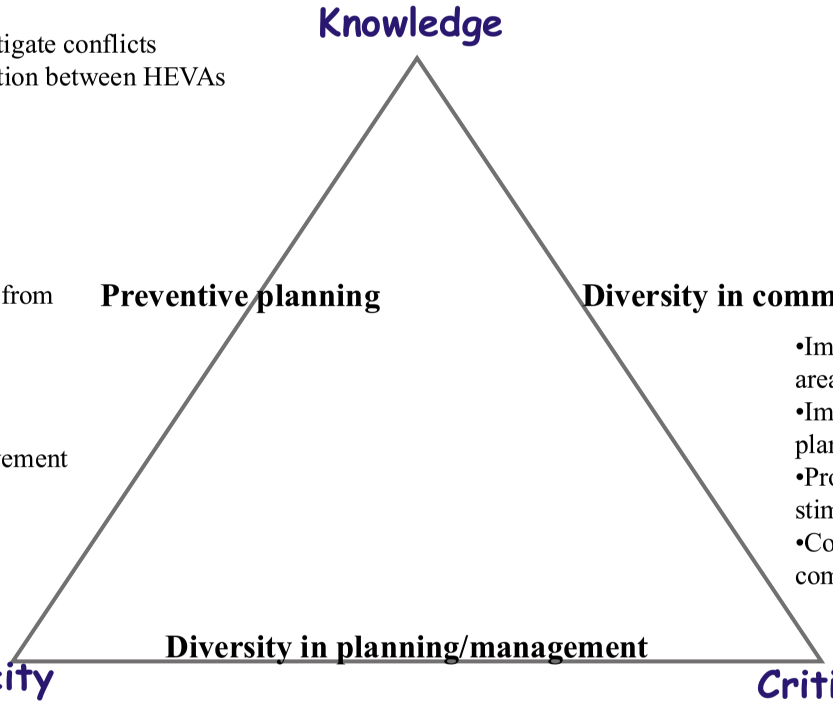
•Improve participation into research
•Education to an active role in decision making
•Participation into management of natural/cultural sites



SUSTAINABILITY VS. GOVERNANCE TRIANGLE

ANNEX I - Visual devices for Working Group (3/3)

•Improve collective knowledge on resources scarcity
•Shared knowledge on cost/benefits due to resources saving
•Use knowledge buinding to mitigate conflicts
•Knowledge of dynamic interaction between HEVAs and surrounding



•Improve participatory approach since from earliest stages of planning
•Warning in risk management
•Mutuality principle between Public Administration and local community
•Integrate long-term sustainable involvement

•Implement networks between protected areas
•Improve cooperation between different planning levels
•Promote transboundary protected areas to stimulate cooperation in different countries
•Convey different stakes of HEVAs into communications events

•Improve capacity building in the Public Administration/Management Authority
•Improve capacity of citizens/groups (NGOs …) in active role in decision-making
•Improve capacity of users/end users for local empowerment (management, …)
•Integrate need of capacity in norms
•Need of clear incentives

•Creative policies (ex.: definition and adoption of regulation based on sustainability criteria)
•Policy and regulation framework requiring reflexive economic models
•Strategies based on long term scenarios
•Acceptance and easier operation of norms and policies

•Multi-cultural and multi-sector stakes involved in decision making
•Develop norms requiring large public hearings and participatory events (ex.: EU Directive on WFD)
•Increase number of stakeholders involved
•Implement public hearings to address decision-making
•Multi-expertise platform

GOVERNANCE TRIANGLE

ANNEX II - Sustainability matrix (1/2)

CONCERNS	ITALIA	MALTA	CYPRUS	GREECE	TURKEY	EGYPT	LYBIA	PALESTINE AUTORITY
SOCIAL –cohesion								
1) Improve stability of farmer in HEVA	H	H		L	M	M	H	H
2) Improve employment rate through HEVAs resources	L	H		M	M	H	M	H
3) Adapt traditional crops to global market needs	L	H		L	M	M	M	M
4) Safeguard cultural heritage	L	H		M	M	L	M	L
5) Reallocation of resources to mitigate potential conflicts	M	L		L	L	L	M	L
ECONOMIC - competitiveness								
1) Increase system income through the marketing of local products	M	H		H	H	H	M	H
2) Increase system GDP	L	H		M	M	H	H	H
3) Investment in training	H	L		H	M	H	H	L
4) Improve transportation network	L	H		M	M	M	M	H
5) Improve public infrastructures	L	L		H	L	M	M	L
ENVIRONMENTAL – limit throughout								
1) Save biodiversity using indigenous plant	M	M		H	H	H	H	H
2) Education/dissemination re: best practices with low environmental impact	H	H		H	H	M	H	M
3) Building scenario to enhance management/risk mitigation	L	H		H	M	L	H	L
Burden sharing (SOCIAL – ECONOMIC)								
1) Distribution of benefits coming from use of heritage/cultural resources	H	M		M	H	M	H	M
2) Collective sharing of costs related to degradation control	L	M		M	H	H	L	M
3) Societal redistribution of potential added value (financial/non tangible) coming from adoption of HEVA	M	M		M	M	L	M	M
Access (SOCIAL – ENVIRONMENTAL)								
1) Ensure access to the use of resources	L	M		M	H	H	H	H
2) Ensure access to knowledge, information tools to design/manage HEVAs	H	H		M	M	M	H	M
Eco-Efficiency (ENVIRONMENTAL-ECONOMIC)								
1) Improving water productivity and water use efficiency	M	H		M	H	H	H	H
2) Creative models of minimal use of resources against increase of productivity	H	M		M	H	H	H	H
3) Improve infrastructure performance	L	M		M	M	M	M	M
4) Control of total material requirement in increasing resources productivity	L	M		M	M	M	M	M

ANNEX II - Sustainability matrix (2/2)

CONCERNS	ITALY	MALTA	CYPRUS	GREECE	TURKEY	EGYPT	LYBIA	PALESTINE AUTHORITY
Co-decision (SOCIAL – GOVERNANCE)								
1) Improve participation into research		H		H	H	H	M	H
2) Education to an active role in decision making		H		H	M	M	H	L
3) Participation into management of natural/cultural sites		M		M	H	H	H	M
Equity (ECONOMIC – GOVERNANCE)								
1) Collective growth		M		M	M	H	M	H
2) Efficient collective allocation of resources		H		M	M	M	M	M
3) System competitiveness		L		M	L	M	H	L
Care (ENVIRONMENTAL – GOVERNANCE)								
1) Increase environmental awareness of different social sectors		M		H	H	H	H	H
2) Innovation in control of degradation		H		M	H	H	H	M
3) Set-up of monitoring system of resources		L		H	H	M	H	H
4) Reflective and preventive modelling for long-term crisis periods (environmental risk,…)		H		M	M	M	H	L
5) Improve investment in public hearings		H		L	L	L	H	M

LEGISLATIVE FRAMEWORK ON MANAGEMENT OF HIGH ENVIRONMENTAL VALUE AREAS

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INTRODUCTION

The research hereby summarized has been conducted by the Faculty of Law team of the University of Bari (UNIBA).

All Partners involved in the Project have been asked to fill and return a template arranged in order to know their Country situation of protected areas and environment legislative framework and many have responded positively and also contributed by sending the main national laws in force regarding protected areas and the environment in general.

Thus, the UNIBA team has been able to merge this information with the studies carried out independently and subsequently draft and deliver an accurate Report.

The Report includes two parts. The first concerns the International and EC legislation regarding protected areas, and a second part detailing each single Partner's legislative framework (i.e. Italy, Cyprus, Egypt, Greece, Malta, Turkey) pertaining to the institution, classification, regulation and management of protected areas. The present article summarizes the results of this second part of the research (for the complete work, see the INNOVA website).

During the various phases of the research, a common methodological approach has been followed. The results have therefore been reported according to the same paragraphs scheme, although they have been subdivided by Country.

ITALY

1. Presence of protected areas in the national legislation. Framework legislation. Object and aim of national legislation concerning the protection of environment.

The Framework **Law no. 394 of 1991** defines, qualifies and protects protected areas as particular environmental assets and constitutes the first level of regulation in the system. The 1991 Law also creates the official List of protected areas. Further to their insertion in the official List, natural areas are protected according to a perspective involving State, regions and local bodies, through the provision of general principles (Title I and, specifically for regional protected natural areas, Title III) and of organs according to the system functionality.

In 1992, the Italian legal system finally implements the “Wild Birds” Directive with **Law 11 February 1992, no. 157**, so called “Hunting Law”, which is followed by the institution of Special Protection Areas (SPAs), by regional initiative.

In 1997, the Habitat Directive is also implemented in Italy with the **D.P.R. (Decree of the President of the Republic) 8 September 1997, no. 357**, relating to the definition and application of conservation measures necessary for the restoration of natural habitats and protected species, as subsequently modified by **D.P.R. 12 March 2003, no. 120**.

In 1998, as **Law 9 December** 1998**, no. 426** comes into force, involving “*New interventions in the environmental field*”, some substantial modifications are made to some fundamental provisions of the Framework Law.

The Framework Law endures some radical modifications also in the light of **Legislative Decree 31 March 1998, no. 112**. The Legislative Decree introduces in the existing legislative scenario some new

“fundamental guidelines”, such as: the ground defence, the infrastructures network articulation, the cities and metropolitan areas system. It awards to the State only duties of national relevance (as per art. 52) listed in art. 69. The other administrative functions are of the regions' and local bodies' competence.

In 2000, the Ministry of Environment approves, with Decree of 3 April 2000, the list of SPAs, designated according to the Directive 79/409/EEC and of the sites of Community importance suggested according to the above mentioned Directive 92/43/EEC.

The set of rules regarding the protection of high environmental value areas is composed of the **Legislative Decree no. 42/2004 “Cultural Assets and Landscape Code” according to art. 10 of Law 6 July 2002, no. 137** - (*Official Gazette 24 February 2004, no. 45*), modified by the new **Code of the environment, Legislative Decree no. 156/06**. Art. 1 of the Decree states that “*as per art. 9 of the Constitution, the Republic protects and develops the cultural heritage coherently with the attributions of art. 117 of the Constitution and according to the provisions of the present code*”, given that the protection and development of the cultural heritage contribute to preserve the memory of the national community and of its territory and to promote the cultural development. Art. 2 defines the cultural heritage as the complex of cultural and landscape assets.

2. Types of protected areas provided for in national legislation and classification criteria.

The 1991 Framework Law defines protected natural areas according to the purposes of conservation and development of the high environmental and naturalistic value which characterises them. **Art. 1** of the Framework Law includes in the assets composing the “natural heritage” all physical, geological, geomorphologic and biological formations, or groups of them, with a relevant naturalistic and environmental value. The Law enumerates four typologies of protected natural areas: national parks, regional natural parks, national and regional natural reserves and (national and international) protected marine areas. The distinction between them is based on the criterion of the territorial dimension of the involved interests (**article 2**).

Furthermore, natural reserves can be divided in:
- **strict natural reserves**: these are areas in which the natural resources are rigorously protected by restricting the human presence for strictly scientific and supervision purposes;
- **natural oriented reserves**: in these areas the managing strategy is aimed at controlling the enjoyment of the territory according to its environmental characteristics and to the development of its full naturalistic potentialities (for instance, through forms of environmentally sustainable tourism);
- **biogenetic natural reserves**: in these areas the primary goal is to preserve the genetic heritage of the plant and animal species which are endangered because of human activities, environmental or geographic isolation;
- **animal populating reserves**: these areas are managed primarily in favour of fauna emergencies present therein and are composed of reserves hosting animal species protected both at a national and international level.

The legislator leaves to the Protected Natural Areas Committee (as per art. 2, par. 5 - Said Committee has subsequently been suppressed by art. 7 of Legislative Decree 28 August 1997, no. 281) possible further classifications which are to be respondent to the protection demands. Thanks to this provision, the above mentioned classification is widened by the **Committee decision of 21 December 1993**, which takes the number of protected natural areas categories to seven, by adding to the previous ones: interregional natural parks, wetlands of international importance and, through a generic recall, other protected natural areas.

Other protected natural areas are identified in environmental associations oasis, in sub urban parks, in natural monuments, etc., which are not part of the previous categories.

The 1993 classification is later overcome by the **Ministry of Environment decision of 2 December 1996**, which places side by side to the other categories the new ones of Special Protection Areas (SPAs) and of Special Areas of Conservation (SACs). Therefore, protected natural areas are definitively classified in: **national parks**, **regional and interregional natural parks**, **natural reserves**, **wetlands of international interest**, **other protected natural areas**, **special protection areas (SPAs)**, **special areas of conservation (SACs)**, **terrestrial and marine retrieval areas**.

Thanks to this decision, SPAs are hence declared to be equal to other protected natural areas, although the EC legislator had conceived and protected them for different purposes. A consequence of this is the complete subjection of SPAs to the protected areas Framework Law and a lack of a specifically conceived regime.

Art. 142 of the Cultural Assets Code, radically modified by Legislative Decree no. 152/2006, further defines "*Areas protected by law*".

3. Internal organization of protected areas. Institutional subjects in charge of protected areas' management.

Art. 8 of the 1991 Framework Law defines the procedures to be carried out in order to set up protected natural areas, whereas **art. 18** establishes the procedure for the institution of protected marine areas.

Art. 1, paragraph 5, Law no. 157/1992, aimed at the protection of wild fauna, according to the prescriptions of the EC legislator and observing constitutional criteria of environmental protection, gives to Regions and - in case of inactivity - to Minister of Environment with Minister of Agricultural Policies, the power of institution of the SPAs alongside the avifauna migration routes, with the aim of allowing the conservation "*in accordance with the ecological needs, of internal and neighbouring habitats*".

Art. 117, letter s) of the Constitution, as modified by Constitutional Law no. 3/2001, gives the State the exclusive legislative competence on the "*environment, the ecosystem and cultural assets*". The same article also gives concurrent legislative competence to the State and the Regions on matters concerning the "*valorisation of cultural and environmental assets and the promotion and organisation of cultural activities*" (meaning that in those areas the State will set the fundamental principles and the Regions will legislate).

On the other hand, **art. 3, paragraph 2**, of Decree no. 357/1997 defines the procedures in order to designate the special Areas of Conservation (SACs), giving the related competence to the Minister of Environment, who designates "*with his own decree adopted in agreement with each interested Region*" the "*sites of Community importance as «Special Areas of Conservation»*".

The procedure of designation and institution of Special Protection Areas (SPAs), with the aim of preserving the avifauna (art. 4 of the "Birds" Directive 79/409/EEC) is different from the procedure relating to the *sites of Community relevance*.

The Framework Law regarding the protected areas (**art. 9**) provides that parks and other equivalent areas are managed by:

- the Park Authority, which has public legal status, registered office in the territory of the park, is subjected to the vigilance of Minister of Environment and consists of the President, the Governing Council, the Executive Council, the Council of Auditors and the Community of the Park;
- the Community of the Park, which is constituted by the Presidents of the regions and provinces, by the Mayors of the municipalities and the Presidents of the mountain territorial associations in which the park areas are located, and represents the consulting and proposing organ of the Park Authority.

The functioning and exercise of the allowed activities within the territory of the park is regulated by the Park Regulations, adopted by the Park Authority, even at the same time as the Park Plan (**art. 12**) and anyhow not later than six months from the approval of the latter. **Art. 11** of the Framework Law indicates in particular the contents of the Park Regulations.

The management of marine protected areas is regulated by **art. 19** of the 1991 Framework Law.

4. Permitted and forbidden activities within the protected areas.

Articles 6 and **11** of the 1991 Framework Law on protected areas enforce the prohibition of performing activities and "*works which may endanger the safeguard of the environment and of*

protected natural habitats, and in particular of the protected flora and fauna and their habitat", and bans a series of other activities listed therein.

Art. 6 of the Framework Law also provides that "*in case of necessity and urgency, the Minister of Environment can, by way of justified measure, once the Committee has been heard, allow derogations of the safeguard measures in question, by prescribing the rules of implementation of works suitable for the safeguard of the natural environment and places integrity*".

The same Law also provides, in case of breach of the above mentioned prohibitions, the issue of criminal sanctions and fines.

On the other hand, **art. 13** of the Framework Law admits that, within the territory of a protected area, certain activities are carried out, and authorizes activities, operations, installations and works which have been previously authorized or granted through specific authorization (Nulla Osta).

Also, the *Code of cultural and environmental goods* prohibits certain activities within the landscape goods, but states that no authorisation is required for particular activities listed in **art. 149** (article modified by Legislative Decree no. 157/2006).

5. Instruments to develop activities within the protected areas and control instruments on forbidden activities.

Article 14 of the 1991 Framework Law identifies the initiatives for economic and social development, by providing that: "*1. In compliance with the purposes of the Park, of the constraints set by the Plan and by the Regulations of the Park, the Community of the Park promotes the initiatives aimed at improving the economic and social development of the communities residents inside the Park and in the adjacent territories (…)*".

Article 29 of the Framework Law disciplines the powers of the Administration Body of the protected area, providing that: "*1. The legal representative of the Administration Body of the protected area, if an activity in violation of the Plan, Regulations or of the specific authorization (*Nulla Osta*) is exercised, orders the immediate suspension of the activity and however orders the restoration or the reconstitution of plant or animal species at the offender's expense, with the joint liability of the ordering customer, of the company owner and of the director of works, in the case of construction and conversion of buildings (…).*

The sanctions system decided by the legislator in 1991 is instead designed according to the provisions of **article 30**.

The supervising functions on landscape assets are governed by **article 155** of the *Code of Cultural Assets* (paragraph 1, as replaced by the Legislative Decree no. 157/2006).

The whole Part Four of the *Code of Cultural Assets and Landscape*, on the other hand, establishes an articulated sanctioning system, involving both administrative and criminal sanctions.

The first apply in the case of:
- breach of obligations and orders provided (**article 167**);
- breach in the field of billposting (**article 168**).

The second apply in case of:
- works executed in the absence of authorisation or in contrast with it (**article 181**).

CYPRUS

1. Presence of protected areas in national legislation. Framework legislation. Object and aim of national legislation concerning the protection of environment.

Nature protection has been subject to legislation and measures in Cyprus since the early 60s (Town and Country Planning Law, Forest Law, Fisheries Law, Law on Game and Wild Birds, a number of International Conventions).

The main relevant law on the environment at present is the **Forest Law No. 14/1967**, which is concerned with the protection and management of forests on a sustained yield basis, protection of important ecological features and the establishment of State Forest protected areas, specified as Permanent Forest Reserves, National Forest Parks and Nature Reserves. The sites are classified according to Part I, Article 3 of the Forest Law. The Council of Ministers may, by notice published in the official *Gazette* of the Republic, declare any main state forest, or part thereof, under the three above-mentioned classes.

The protection, preservation and management of marine and coastal areas and species is regulated by the **Fisheries Law (No. 61(I)/2001) and the Law on the Protection and Management of Nature and Wildlife (No. 153(I)/2003).** This latter regulates the protection of biological diversity, mainly via the identification of special areas of protection and protected species of fauna and flora, the adoption of management plans, the assessment of environmental impacts from projects and programmes in areas of special interest and the control of the release into the environment of alien species.

The introduction of genetically modified organisms is regulated by **Law No. 160(I)/2003**, which transposed Directive 2001/18/EC. Generally, Cyprus has a highly restrictive policy for such releases.

The **Game and Wild Birds Protection and Development Law No. 39/1974** (amended in 1991 and 1996) is concerned with control of hunting and protection of non-game (migratory) birds. Under this legislation it is possible to protect game and wild birds by the establishment of temporary or permanent game reserves. Hunting legislation is enforced through the Game Fund Service of the Ministry of the Interior.

The **Foreshore Protection Law of 1934** (Cap. 59 and Laws nos. 22/61, 17/64 and 8/72) defines the foreshore as all lands within 100 yards of the high water mark. It provides for coastal zones of exceptional beauty which may be declared off limits to construction of any kind, up to 90m inland; fisheries management is regulated through the Fisheries Law and the relevant fisheries regulations.

The Town and Country Planning Law No. 90/1972 is one of the basic environmental laws. It provides for an integrated environmental plan for the island and includes chapters on the fixing of "*areas of special social, historical, architectural or cultural interest or natural beauty and other subjects of wider or local interest*"; for the preparation of plans for protecting areas with special importance including "*nature protection areas*" and the provision of areas for tourism or other purposes. It also states that the Minister has the power to issue orders to set up protected areas for natural sites having "*special national character*". Through the Town and Country Planning Law, areas of aesthetic and landscape value have been declared as Coasts and Areas for the Protection of Nature and Protected Landscapes, with very prohibitive provisions as far as development control is concerned.

The most recent laws transposing the nature-related EU Directives (basically Habitats and Wild Birds), are the mentioned Law on the Protection and Management of Nature and Wild Life (No.153(II)/2003) and the **Law on the Protection and Management of Wild Birds and Game (No. 152(I)/2003).**

In the framework of the EU Network "NATURA 2000", a scientific list of areas, including important types of habitats and species of fauna and flora, was prepared. Almost all the types of habitats of Cyprus and most of the endemic ones will be included within boundaries of areas of the Network.

2. Types of protected areas provided for in national legislation and classification criteria.

With regard to preservation of nature, landscapes and forests, there are three types of areas on the basis of national legislation:

(a) Areas of Exceptional Natural Beauty;
(b) Protected Areas or Landscapes;
(c) Seashores and Areas in which Nature is protected.

According to Forest Law, State Forests are protected areas, sub-specified as:

- **Permanent Forest Reserves**
- **National Forest Parks**
- **Nature Reserves**

According to Cyprus Forest Law, flora and fauna are totally protected within a Nature Reserve. Cyprus has already identified areas of high ecological importance according to the EU Habitats and Birds Directives, and the proposed list of sites has been compiled for inclusion into the "NATURA 2000" Network.

Other types of classifications include the following:

- **Marine Reserves**

These are established under the Game and Wild Birds Protection and Development Law, No 39 of 1974.

- **Permanent Game Reserves**

These were designated under the Game and Wild Birds Protection and Development Law No. 39/1974 according to which the shooting, pursuing or catching of any bird is forbidden.

- **Foreshore Protection Zone**

The Foreshore Protection Law establishes a foreshore protection zone where it is prohibited to perform certain works, build or construct various structures and buildings, dispose waste, park vehicles or place objects on the beach.

3. Internal organisation of protected areas. Institutional subjects in charge of protected areas' management.

At the national level, the Council of Ministers has overall responsibility for the formulation of environmental policy, which is coordinated through the Ministry of Agriculture, Natural Resources and Environment (MANRE), responsible for the implementation of government policy in the fields of agriculture, breeding, natural resources, and environment. The Council for Environment has wide representation and advices the Minister, and thereby the Council of Ministers, on environment and sustainable development issues.

Responsibility for environmental issues is shared between several Ministries (mainly the MANRE and the Ministry of Interior Affairs) and Departments. The Environment Service is a department residing within the MANRE, mandated to advice on environmental policy, ensure implementation and policy enforcement and coordinate the process for adoption of EU environmental policy and legislation.

The Department of Fisheries and Marine Research is responsible for the marine biodiversity and within its mandate of activities the conservation of endangered marine species (turtles, monk seal, dolphins etc.) and habitats (e.g. Posidonia beds) is a priority.

Forests are being managed by the Department of Forests of the Ministry of Agriculture and Natural Resources. The Department of Forests is responsible for creating, maintaining and improving picnic and camp sites as well as for looking after the National Forest Parks in the State Forest. The Director of the Department of Forests may, with the approval of the Minister of Agriculture, make regulations in respect of each class of protected area (**art. 6** and **7** of the Forest Law).

4. Permitted and forbidden activities within the protected areas.

Building is permitted in the Residential Area of the three villages. The Building Area is restricted within certain limits defined by the Department of Town Planning (Ministry of Interior Affairs).

Agriculture is practiced in the agricultural zone which surrounds the Residential Zone and is about 5 to 10 times larger than the Residential Zone. Small houses, only for private use, may be also built on agricultural land, on any piece of land which is equal or larger than about 3 decares. In the agricultural zone, reallocation of private property may be carried out by the Minister of Interior.

Hunting is allowed on the agricultural land and the forest area which is further than the agricultural zone and often is attached to it. The Game and Wild Birds Protection and Development Law regulates hunting of hares and game birds and prohibits traps for hunting of game species and wild birds.

Construction of roads and other “necessary” works, particularly with regard to water supply, may take place in all zones within forested areas. The Cyprus Forest Law prohibits the lighting of any fire in the forest or within a radius of 1 Km from the boundaries of the forests. Any person who causes a forest fire shall be liable, in case of conviction, to imprisonment for a term not exceeding five years or to a fine not exceeding five thousand pounds, or to both such sentences.

The Forest Law prohibits the collection of any non-wood forest products when found in or brought from any State or Private Forest placed under government control, unless permission is granted by the Director of the Department of Forests. The Law provides that harm to or collection of any wild vegetation can be subject to prosecution. Grazing is prohibited in main State Forests; it is only allowed in grazing areas in minor State Forests provided that a license has been obtained. The inhabitants of certain villages close to forests can obtain a license without fee or charge to gather fuel wood from State Forests for their own domestic needs.

Forest logging is prohibited by law, and various programmes for reforestation and woodland regeneration are currently in place by the Forestry Department. Organised units of trained personnel implement the policy for the protection of forests by forest fires.

With regard to marine water pollution, prohibitions are dealt with in **Regulation 14** of the Fisheries Regulations 1991. The same Regulation also deals particularly with the pollution of the “sea area”.

5. Instruments to develop activities within the protected areas and control instruments on forbidden activities.

Encouragement of sustainable farming is incorporated into the Rural Development Scheme, to which farmers have responded positively. This target has also been incorporated into the National Forest Programme (2000 to 2009).

Products of the area are mainly agricultural. Tourist activities include visits of local visitors and foreign tourists to the old churches of the area and visits also to the Museum of «cumandaria», a local sweet wine.

Protected tree species include *Olea europaea*, all *Pinus* species and *Ceratonia siliqua*. Some bird species are also protected and hunting is prohibited during spring and summer for regeneration of different bird species. Hunting during the forbidden period implies penalties including imprisonment.

Buildings, if constructed illegally, may be destroyed by the District Officer Authorities.

EGYPT

1. Presence of protected areas in national legislation. Framework legislation. Object and aim of national legislation concerning the protection of environment.

Throughout its long history, the Egyptian government showed interest in certain species of plants and animals and protected them either as sacred or in the pretext of governmental monopoly. This interest continued until the recent times when the **Agricultural Law no. 53/1966** was passed, in which Section 3 dealt with the protection of useful birds, wild animals, etc.

Although its **Constitution of 1971** (amended in 1980 and 2005) contains no mention of a right to the environment or nature protection as such, nevertheless, in the field of environmental legislation, Egypt has introduced a number of laws concerning the conservation of plant and animal life and of nature in general. The Ministry of Agriculture was empowered to put these laws into effect and to follow up their implementation. To achieve this objective, in 1979 the Ministry of Agriculture set up the Egyptian Wildlife Service (EWS) (an authority for the protection of nature).

In 1983, **Law no. 102/1983** was enacted and it set up the legal framework for the declaration and management of protected areas through the system of Nature Protectorates, defined in **article 1**. This law empowered the Prime Minister to designate certain areas to be declared as protectorates.

Environment Law no. 4/1994 provided for the creation of an agency for the protection and promotion of the environment, the Environment Affairs Agency (EEAA), destined to formulate the general policy and to prepare the necessary plans for the protection and promotion of the environment. It should also follow up the implementation of such plans.

This was later followed by signing and ratifying conventions and agreements pertaining to the various aspects of biodiversity conservation.

Environmental issues in Egypt are governed by Law No. 4 of 1994. The law provides for a mandatory environmental review, to be undertaken by the competent administrative authority according to EEAA's instructions, as part of the approval process for all proposed projects.

2. Types of protected areas provided for in national legislation and classification criteria.

According to Law no. 102/1983, **Nature Protectorates** are defined in article 1 as "*any area of Land, or coastal or inland water characterized by flora, fauna, and natural features having cultural, scientific, tourist or aesthetic value. These areas will be designated and delineated by Decree of the Prime Minister upon the recommendation of the Egyptian Environmental Affairs Agency*".

3. Internal organisation of protected areas. Institutional subjects in charge of protected areas' management.

Law no. 102/1983 on Nature Protectorates establishes, in **article 4**, that "*The Administrative Body (responsible for the enforcement of the provisions of this Law and related decrees) will be specified in a separate Decree issued by the Prime Minister. This Administrative Body will be empowered to establish regional offices within the Governorates having protectorates, and will be responsible for the following functions (…)*".

In 1994, Law no. 4/1994 replaced the agency established with the Presidential Decree no. 631/1982 with the Egyptian Environmental Affairs Agency (EEAA). The EEAA became the organization which prepares the preliminary studies underlying the Prime Minister's decisions and follows up their implementation. The task of most sectors of EEAA is policy-making, planning and supervising implementation of plans carried out by governmental and non-governmental organizations (**articles 2** and **5**).

Each protected area is managed by a Body, the members of which are representatives of EEAA, EWS, of the Governorate or of other public offices.

4. Permitted and forbidden activities within the protected areas.

Agricultural Law no. 53/1966 empowered the Minister of Agriculture to compile lists of protected animals and plants, and to issue decrees prohibiting harm to all species in certain areas. In 1979, the Minister of Agriculture issued decree no. 349 to establish the EWS to act as the national instrument in this respect.

Within the authority of the local administrators (Governors), some decrees were issued prohibiting the hunting of birds and wild animals in certain regions, especially the rare and endangered species.

Law no. 102/1983, concerning Nature Protectorates, provides that certain activities are forbidden in these protected areas (**articles 2** and **3**).

Article 28 of Law no. 4/1994 regulates the hunting of wild animals and prohibits the destruction of their natural habitats. This Law also forbids several other activities: the related regulations can roughly be grouped according to the pollutant emissions from various activities (**articles 29**, **30** and **31**).

It is also forbidden to import hazardous waste or to allow its entrance into or passage through Egyptian territories (**article 32).** All establishments (industrial and others) are required to ensure that while practicing their activities no leaked or emitted air pollutants (caused by the burning of fuel, etc.) shall exceed the maximum permissible levels (**articles 34**, **35** and **36**). It is also prohibited to

incinerate, to dispose of or to treat garbage and solid wastes as well as to spray pesticides or any other chemical compound unless it is done according to the conditions and safety measures specified in the Executive Regulations of the law (**articles 37 to 53** and **60 to 74**).

5. Instruments to develop activities within the protected areas and control instruments on forbidden activities

Law no. 102/1983 on Nature Protectorates deals with penalties and fines imposed in case of breach of its provisions in **articles 7**, **8** and **9**.

Also, Law no. 4/1994 further provides for a system of incentives to be offered to those who implement environmental protection activities or projects and sets penalties for those who are in violation of its provisions (**articles 17 and 18** and **articles 84 to 101**).

GREECE

1. Presence of protected areas in national legislation. Framework legislation. Object and aim of national legislation concerning the protection of environment.

The Greek national legislation has a unique nature. It is characterised by an enormous production of legislation of any category. Greece has produced until now as much as fifty times the quantity of the legislation of any other European State.

The Greek Constitution provides for the protection of the environment in general. Consequently, it also protects water as a vital element of the natural environment. It states that "*the protection of the natural and cultural environment constitutes a duty of the State and a right of every person*". After the 2001 revision of a number of its provisions, two new constitutional rights have been introduced: the right to the environment, formatted by way of amendment of the (existing) **article 24**, and the right to information, provided by the newly formatted **article 5A** of the Constitution.

One of the first pieces of protected areas legislation enacted in this century in Greece was the Forest Code (**Law no. 4173/1929**) which called for special measures to be taken in the management of certain areas to be known as Protected Forests.

Another important piece of early legislation giving protected status to certain areas was the **Antiquities Law no. 5321/1932**, protecting archaeological features and an area of 500m radius around them (and later extended by **Law no. 1469/1950** to modern monuments and landscapes of natural beauty) automatically, by law, with no need for a special designation.

Referring particularly to nature conservation, it was first initiated in Greece in the form of national parks: the legislative definition of the term "National Park" was born in the **Law no. 856/37** in 1937. The organisation of National Parks' objectives is achieved through the realisation of a two-zoning protection system: the core receiving strict protection and the periphery with moderate level of protection acting mainly as buffer zone.

The next significant proliferation of the protected areas system came in 1971 with **Law no. 996/1971**, which complemented Law no. 856/37: conservation was the primary purpose of the parks with recreation only allowed where conservation values were not compromised. This law also added substantial protection for two more protected categories: Aesthetic Forests and Protected Natural Monuments.

In 1971 the Forest Service, a department of the Ministry of Agriculture, was given supervision of the existing parks as well as the authority to propose new ones which were then created by executive act.

Subsequently, Law no. 860/1976 for Physical Planning and Environment, Law no. 998/1979 for the Protection of Forests and Wooded Tracts of the Country, as well as Law no. 1650/1986 for the Protection of the Environment, provide the basis for the protection of the natural environment and Legislative Decree no. 86/1986 about the Forestry Code is a legal source of protection of forests.

The most significant change to the operation of the protected area system came with the institutional law on the environment, **Law no. 1650/1986** (Government Gazette GG 160/A/86), later amended by law no. 3010/2002 (GG 91/A/02), replacing all previous legislation. It introduced certain changes in site designation procedure and five new categories of protected areas including Marine Parks, and provides for the protection of natural resources and ecosystems, of surface and underground waters as well. **Article 1** of Law no. 1650/1986 concerns the aim of the law itself. This Law follows the screening process for Environmental Impact Assessment, separating projects and activities in three categories, pursuant to **article 3**, depending upon their effects on the environment.

The EC Directive 92/43/EC on the Conservation of Natural Habitats and Wild Fauna and Flora was harmonized in the Greek legal framework by Joint Ministerial Decision 33318/3028/98 (GG 1289/B/98).

The EC Directive 79/409/EC on the Conservation of Wild Birds was harmonized in the Greek legal framework by JMD 414985/1985 (GG 757/B/85) "Management Measures for the Wild Avifauna".

In 1998, pursuant to the regulations of article 5 of the JMD 33318/3028/1998, a commission "NATURA 2000" is established by MD 135286/5447/2002 (GG 1589/B/02).

In 2003, **Law no. 3208/2003** on the Protection of Forest Ecosystem was approved. Article 2 of this Law mentions that the planning of management and exploitation of forest ecosystems and the forestry actions and practices "*have to ensure the protection of the landscape and the conservation of biodiversity*". In this framework, the creation of *agrobiotopes* by environmental organizations and owners of agricultural land is supported financially.

There are plenty more Laws, Presidential Decrees and Joint Ministerial Decisions that have direct effect on Nature Management and have been enacted. Furthermore, there are Laws ratifying relevant International Conventions, Agreements or Protocols, which are complementary to the above mentioned legal framework.

2. Types of protected areas provided for in national legislation and classification criteria.

The main categories of protected areas in Greece are so declared and managed on the basis of Forestry Acts and especially Law no. 996/1971. These areas are distinguished between:

- **Aesthetic Forests** (under forest legislation since 1938)

The term designates wooded areas or natural landscapes of special aesthetic, ecological and tourist value, whose flora, fauna and singular natural beauty must be protected.

- **Natural Monuments/Natural Landmarks**

These are sites of particular palaeontological, geomorphological, and historical importance that cannot be characterized as National Parks or Aesthetic Forests according to Law no. 996/1971.

- **Game Reserves and Hunting Reserves** (protected under the hunting legislation)

These areas compose a network of protected areas where the hunting regulations play an important role in the protection of fauna.

Framework Law no. 1650/1986 for environmental protection, introduced by the Ministry of Environment, Planning and Public Works (MEPPW), lays down guiding rules for nature conservation and management of protected areas. It also provided for the future institution of additional classes of protected areas, such as eco-development, marine parks, etc. through forthcoming legislation. According to **article 19** the protected areas are characterized as:

- **Areas of Absolute Protection of Nature**

These areas are defined by article 19.

- **Nature Protection Areas**

Within these areas, Areas of Strict Nature Protection correspond with IUCN category 1a "**Strict Nature Reserve"** (protected area managed mainly for science), whereas Areas of Nature Protection correspond with IUCN category 1b "**Wilderness Area"** (Protected area managed mainly for wilderness protection).

- **National Parks**

These areas are defined according to article 19, par. 3, of Law no. 1650/1986. According to article 3, paragraph 1, of Law no. 996/1971, areas of special ecological interest due to the rare and variegated indigenous flora and fauna, in respect of their geomorphologic formations, subsoil, water, atmosphere and their natural environment in general, can be declared National Parks. Inside, they can include areas for Strict Nature Protection and areas for Nature Protection.

- **Protected Natural Formations**

These areas are defined according to article 19, par. 4, of Law no. 1650/1986 and correspond with IUCN category III "**Natural monument" (**protected area managed mainly for conservation of specific natural features).

- **Eco-development Areas**

These areas are defined according to article 19, par. 5, of Law no. 1650/1986 and correspond with IUCN category IV "Managed Resource Protected Area" **(**protected area managed mainly for the sustainable use of natural ecosystems). Eco-development Areas may include Areas of Strict Nature Protection and Areas of Nature Protection.

- **Marine Parks**

These areas are defined by article 19, par. 3, of Law no. 1650/1986.

In the context of International Law and EC Directives that promote protection of the natural environment, 11 wetlands have been considered as specially significant and meriting protection for their natural diversity, under the Ramsar Convention on Wetlands of International Importance, and some 359 sites have been listed as SPAs and SCIs under the so called Habitats Directive and the Wild Birds Directive, as follows:

- **Wetlands of international importance (Ramsar sites).**

These are included in the International Convention of Ramsar (1971) signed by Greece and ratified by virtue of Legislative Decree 191/74.

- **Shelters of wild life** (under forest legislation)
- **Protected areas (SPAs and SCIs)**.

Article 21 concerns the designation process of protected areas.

3. Internal organisation of protected areas. Institutional subjects in charge of protected areas' management.

It can be said that management of protected areas was defined in 1999 by Law no. 2742/1999, through the establishment of managing authorities (MAs) and the "NATURA 2000" Committee. The relevant provisions are grouped under chapter V, entitled "*Administration and management of protected areas*". Law no. 1650/1986 was amended by the Law no. 2742/1999 in order to implement the wording that management bodies were to be established for protected areas. For each protected area, a management plan has to be issued and management bodies have to be established.

The MAs were established as conservation bodies legally entitled to take over the administration and management of the NATURA sites from the formal coercive powers and direct State control of forest service (FDOs) and the Ministry of EPPW. Unlike FDOs and the MEPPW, MAs are autonomous and non-departmental boards that were granted the status of an independent agency accountable to the Minister of EPPW.

Most recently, **article 19, paragraph 1**, of Law no. 3208/2003 has established that in the interests of environmental protection and promotion of the national economy, forests whose management and exploitation has been abandoned over the past twenty years come under the management of the competent Forest Authority.

In **article 20** of the same Law the establishment of offices and positions for the implementation of the Convention on international trade in endangered species of wild fauna and flora (CITES Convention) is arranged. Specifically in the Administration of Aesthetic Forests, National Parks and Hunting of the Ministry of Rural Development and Food, which is appointed as the Central

Administrative Authority, a Department entitled “International Conventions'” is established and made responsible for the supervision and the implementation of the Convention and the issue of the relevant permits to the Greek State. Respectively, in regional forest administrations, offices entitled “International Conventions'” are established, which are assigned to the aforementioned administration and the relevant positions are created.

Until today, 27 Management bodies have been established for protected areas on the basis of Joint Ministerial Decisions.

An internal regulation of protected areas is provided for by **art. 18, par. 5**, of Law no. 1650/1986. **Article 21, par. 2**, in turn, provides that the general terms, restrictions and prohibitions required for the protection of the specific area are determined by the Presidential Decree of designation.

4. Permitted and forbidden activities within the protected areas.

Pursuant to **article 19, paragraph 1**, of Law no. 1650/1986, “*in the areas of absolute protection of nature all activities are restricted. Exceptionally, under the specific regulations of the relevant law, undertaking of scientific research and works aiming at the conservation of characteristics are allowed provided a high degree of protection*”.

In Areas of Nature Protection, all activities that may change or degrade the natural condition, structure or evolution of the natural environment are excluded. According to **paragraph 2 of article 19** of the Law, research activities and traditional ones may be authorized on condition that they do not result in the degradation of the site. Human presence is only allowed for the implementation of permitted activities, and only after authorization granted by the management body. Hunting will be forbidden.

- In National Parks, activities of educative or recreational and traditional character are permitted under condition of non restriction of the balanced preservation of their ecosystems (**art. 19, par. 3**, Law no. 1650/1986). In the National Parks, the construction works, research activities and traditional ones are permitted, subject to the terms and limitations better by the operating and management regulations of the National Park.

In areas of eco-development, certain activities such as agro tourism, camping and small industry related with traditional habits of the population, are permitted (**art. 19, par. 5**, Law no. 1650/1986).

The criteria concerning permitted activities can be identified in the harmonization with the protection of nature and of the site at issue, as well as the adaptability with natural environmental and local architecture.

5. Instruments to develop activities within the protected areas and control instruments on forbidden activities.

Incentives for agricultural eco-compatible activities, promotion of products and services within the area, promotion of tourist activities and preservation of artistic legacy are permitted and encouraged, only in areas characterised as Eco-development Areas, and under the conditions provided by Law no. 1650/1986 and specified by the internal organization of each one of them. As far as protected species and natural habitats preservation are concerned, these activities are permitted in National Parks.

Both criminal and administrative sanctions are provided for individuals (privates and legal persons) found guilty of pollution or degradation of the environment in general and of exercising forbidden activities in protected areas, pursuant to **articles 28**, **29** and **30** of Law no. 1650/1986.

The power of authorization to carry out permitted activities within the area has been delegated to the MAs and the Forest authorities. MAs are empowered to exert all functions of plan making, management, research and administration except executive control.

MALTA

1. Presence of protected areas in national legislation. Framework legislation. Object and aim of national legislation concerning the protection of environment.

The duty to protect the environment, both as a duty of every person and as a duty of the Government, was set out in Maltese legislation both in the Preamble to the Environment Protection Act V of 1991 and in Part II of the Environment Protection Act XX of 2001, entitled "*Duty to Protect the Environment*" (**articles 3** and **4**). The right to information is mentioned in **article 23** of the Environment Protection Act of 2001. Maltese legislation implementing Directive 2003/4/EC on public access to environmental information, in force since 17 May 2005 (L.N. 116/05), guarantees the right of access to environmental information held by or for public authorities.

The most important nature conservation legislation therefore is the **Filfla Nature Reserve Act (Act XV of 1988)**, the **Environment Protection Act (Act V of 1991)** and **Environmental Protection Act (Act XX of 2001) - EPA**.

The Filfla Nature Reserve Act declares Filfla a strict Nature Reserve and prohibits access to the site itself except by permission for educational and scientific purposes. All flora and fauna on Filfla are also legally protected by this Act.

The Environment Protection Act no. V of 1991 supplies in Part 1 "*Directives and Codes of Practice concerning the quality of the Environment*".

The new Environment Protection Act was published on the 18th September 2001 as Chapter 435 of the Laws of Malta. It is essentially a framework law with no clear-cut obligations, but through its various mandatory provisions grants the Minister responsible for the environment the possibility to issue subsidiary legislation on various issues related to, amongst others, the protection of biological diversity.

The **Conservation of Wild Birds Regulations** (**L. N. 79/2006)** transpose Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds into national law.

The **Trade in Species of Fauna and Flora Regulations (L. N. 236/2004)** repealed Legal Notice no. 19 of 1992 and its subsequent amendments. They were drawn up to enable the enforcement of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The **Flora, Fauna and Natural Habitats Protection Regulations (L. N. 257/2003)** mainly transpose the so called Habitats Directive, but also relevant provisions of EU Decisions 82/72/EEC, 82/461/EEC, 93/626/EEC, 97/266/EC, 98/145/EC, 98/746/EC and 99/800/EC, as well as designates Special Areas of Conservation (SAC), according to EU obligations.

The **Development Structure Plan** was drawn up in 1992 and forms the basis of future land use and development policy for the Maltese islands. The stated basic objective of the Structure Plan is that of optimizing the physical use and development of land which respects the environment and, at the same time, ensuring that the basic social needs of the community are, as far as is practical, satisfied.

2. Types of protected areas provided for in national legislation and classification criteria.

There is a multitude of protected areas types in Malta: some owe their origins to locally perceived needs expressed over time while others have been designated to satisfy international obligations.

National designations are:
- **Area of Ecological Importance (AEI)**
- **Site of Scientific Importance (SSI)**

In terms of national designations, 14 sites have been designated since 2002 as Areas of Special Scientific Importance (SSI) and/or Ecological Importance (AEI) under the 1992 Development Planning Act. Currently SSIs and AEIs total 57 sites/areas representing 13%of the total land area.

- **Bird Sanctuary**

In addition to these, 24 Bird Sanctuaries occupy about five percent of Malta's land area. These are regulated by the Conservation of Wild Birds Regulations of 2006.

- **List of Historical Trees having an Antiquarian Importance**
- **Nature Reserve**
- **Nature Reserve (Trees)**

There are also 32 Nature Reserves (29 are Nature Reserves (Trees and Woodlands) and 3 are Nature Reserves at Filfla, Fungus Rock and St. Paul's Islands where access is strictly controlled).

- **No Berthing Zone/No Entry Zone except for fisheries**
- **Special Area of Conservation (SAC)**

According to **article 2** of the Flora, Fauna and Natural Habitats Protection Regulations (L. N. 257/2003), "*"Special Area of Conservation" or "SAC" means a protected area and a site of National Importance and of International Importance*". These are selected according to the provisions of **article 5** of the Flora, Fauna and Natural Habitats Protection Regulations (L. N. 257/2003).

These areas, together with Special Protection Areas (which primarily cater for the protection of migratory birds), form the "NATURA 2000" Network.

- **Ramsar Sites**

The wetlands at L-Ghadira and Is-Simar are designated Wetlands of International Importance, also known as Ramsar Sites.

- **Specially Protected Areas (SPA)**

Four sites, namely Filfla and the surrounding islands, Hagret il-general, Ghadira and St. Paul's Islands are designated as Specially Protected Areas (SPA Protocol).

3. Internal organisation of protected areas. Institutional subjects in charge of protected areas' management.

The Ministry of Tourism and Culture is responsible for cultural heritage; which includes World Heritage designated sites. The operational work of this Ministry is carried out by Heritage Malta.

The Ministry for Rural Affairs and the Environment (MRAE) is responsible for the formulation and implementation of policies relating to the promotion of sustainable development, protection and management of the environment and the sustainable management of natural resources. It is also responsible for protected areas.

The designation, planning and drafting of management plans of such sites is operated through Malta Environment and Planning Authority (MEPA) which falls under the responsibility of MRAE. The PARK dept is responsible for the restoration of the countryside including the creation of parks for recreation and ecological purposes. Afforestation and habitat creation also falls within its responsibility. MEPA is responsible for implementing Government policy with regards to the regulation of the environment. Amongst the entities responsible for the enforcement and administration of environmental law, MEPA is the predominant player: it is a statutory authority, independent of the government, set up under the Planning Development Act (Chapter 356 of the Laws of Malta).

A newcomer to the Maltese environmental scene is the *National Commission for Sustainable Development* (NCSD). This entity was set up in February 2002, in the aftermath of the United Nations Conference on Environment and Development.

The Environment Landscapes Consortium (ELC) deals with the embellishment and landscaping of urban areas whilst the Department for Parks, Afforestation and Countryside Restoration (PARK) is responsible for afforestation and the maintenance of rural areas and national parks. As none of these entities can provide strategic environmental policy direction, the Directorate of Environment Policy and Initiatives was set up in September 2005 to advise the Ministry on the formulation of environmental policy, own all policy options developed within the Ministry and ensure that policy options are implemented through the development and execution of appropriate programmes.

No one single institution is responsible for all protected areas although they are all regulated by environmental and development legislation. These are mainly administered by MEPA, although *ad hoc* committees have been set up for specific protected areas.

4. Permitted and forbidden activities within protected areas.

In protected areas, agricultural activities are generally permitted. Building development is controlled by MEPA: a designation of ODZ (Outside Development Zone) severely limits development other than tourist establishments, schools, and major infrastructural projects. Development within protected areas necessitates full Environmental Impact Assessment. Therefore, Environmental Impact Assessment is mandatory for any development of a permanent character within protected areas.

Other regulated activities are hunting and trapping (forbidden within Protected Areas), trespassing (forbidden on Filfla and General's rock except for special permits issued by MEPA for research purposes), recreation activities (controlled to minimise environmental impact), fishing (still permitted around Filfla and at Dwejra).

The Filfla Nature Reserve Act no. XV contains regulations stating that nothing may be killed, captured, collected, trapped, commercially exploited or removed from the reserve except with the written permission of the Minister. Camping is not permitted and written permission of the Minister responsible for the environment is required for access, and then only on educational and scientific grounds. Generally, it can be said that all activities which impact on the environment require approval from the authorities, in the form of a permit or licence.

5. Instruments to develop activities within the protected areas and control instruments on forbidden activities.

There are no specific activities or procedures developed for protected areas. For organic farming incentives include a subsidy of EUR 600/Hec and marketing and educational assistance by the Agri Dept for whoever wishes to revert to organic farming. MTA (Malta Tourism Authority) is specifically charged with responsibility for promoting tourist activity within Malta. This would include tourist activity within protected areas.

Heritage Malta is responsible for the management of cultural heritage sites. The Superintendent for cultural heritage is legally responsible for preserving and conserving artistic and cultural heritage.

Enforcement of environmental law is principally carried out by MEPA through the hand of its enforcement officers. Various aspects of environmental law enforcement, however, fall (occasionally, jointly with MEPA) within the portfolio of other State entities such as the Malta Maritime Authority, the Malta Resources Authority, the Executive Police and the local wardens.

The general rule is that a person who carries out an activity, of whatever nature, for which a licence is required or acts in breach of any condition attached to such a licence, will be guilty of a criminal offence **(art.11, paragraph 3 of 2001** Environmental Protection Act). The Malta Police force (mainly the Administrative Law Enforcement section - ALE) is responsible for enforcement regulations applicable to protected areas' other than development.

TURKEY

1. Presence of protected areas in national legislation. Framework legislation. Object and aim of national legislation concerning the protection of environment.

The Turkish Constitution (1982) stipulates that "*the State shall take the necessary precautions towards the protection and utilization of natural resources*" and it has some general clauses broadly related to its conservation. For example, **article 56** states that "*Everyone has the right to live in a healthy, balanced environment. It is the duty of the State and citizens to improve the natural environment, and to prevent environmental pollution*"; whereas **article 63** states the principle of protecting cultural and natural resources "*The State shall ensure the conservation of the historical,*

cultural and natural assets and wealth, and shall take supportive and promotive measures towards this end".

The modern concept of the protected nature conservation area was introduced in 1949, with legal establishment of national parks coming into being on 5 September 1956, under **Forest Law no. 6831/1956**. The law categorised forest ownership into State Forest, Forests of organizations belonging to legal persons and Private Forests; being further sub-divided into Protection Forests, National Parks and Production Forests.

In 1983 the Ministry of Agriculture, Forestry and Rural Affairs enacted the current **National Park Law no. 2873/1983** in order to establish the principles governing the selection and designation of national parks, natural monuments and nature reserve areas; a law concerned with the protection, development and management of such protected areas without spoiling their natural characteristics.

In the same year the **Environment Law no. 2872/1983 (amended by Law no. 5491/2006 "concerning the amendment of the Law on Environment")**, with prime objectives of general protection of the environment and the prevention of pollution, was enacted by the Ministry of Environment. Under this Law zones of special protection of the environment, special protected areas, can be declared. An enabling act of 19 October 1989 provided for protected zonation within these areas.

In addition to the protected areas governed by the National Park Law, a series of game forest sites was established on state forest and notified under Hunting Law No. 3167/1937 (substituted by **Law no. 4915/2003 "on Terrestrial Hunting")**: game breeding and protection areas, game breeding stations, game reintroduction areas and biogenetic or nature conservation areas.

Additional laws relating to protected areas include **Law No. 2863/1983 "on conservation of cultural and natural heritage"**, (administered by the Ministry of Culture and Tourism), amended in 1987 by Law no. 3386; and Law No. 1380/1971 for the protection of water resources, management and improvement (**Fisheries Law**), amended by **Law no. 3288/1986**.

In the 1980s, the **Law of the Bosphorus no. 2960/1983** was enacted in order to protect the cultural, historic and scenic beauty of the Bosphorus region. In 1990 the **Coastal Law no. 3621/1990** was adopted which would delimit the coastal zone and prohibit building within this area.

At the international level, Turkey has entered a number of cooperative agreements and legal obligations. Turkey is party to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention, 1994) and its Ministry of Environment has issued in 2002 a **Regulation on Conservation of Wetland** for the implementation of said Convention.

Although Turkey is not a member state of the European Community and not party to the 1979 EC Wild Birds Directive, 79 important bird areas (EC special protection areas) have been identified. Other important laws are the followings:

Law no. 5491/2006 "concerning the amendment of the Law on Environment" Article 1 (amending article 1 of Law on Environment no. 2872/1983) states that: "*The purpose of this Law is to protect the environment, which is the common asset of all the living beings, in line with the principles of sustainable environment and sustainable development*". **Article 3** sets the general principles pertaining to the protection and improvement of the environment and the prevention of pollution. **Article 6** amends article 9 of Law no. 2872, including the header, as follows: "*The Protection of The Environment*" *article 9*.

Forest Law no. 6831/1956 - National forests (state forests) are established to preserve nature and some urban and/or agricultural land from erosion. Forest recreation areas are established for tourist, cultural and public recreational purposes. Section 1 identifies the object of the Law, as **articles 1 to 6** concern the description, partition, administration and auditing of the Forests.

National Park Law no. 2873/1983 - According to **article 1**, "*The Objective of this Act is to arrange the principles pertaining to choosing and determining the national parks, parks of nature, monuments of nature and nature preservation areas which carry values at national and international level and to preserve, develop and manage these without spoiling their features and characteristics*". There are 25 articles cited in the Law: **article 2** defines the four main protected area categories.

Law no. 4915/2003 "on Terrestrial Hunting" - The objective and scope of this Law are clarified in **article 1**.

Law no. 2863/1983 on the Conservation of Cultural and Natural Heritage - **Articles 1** and **2** of this Law explain *"Aim"* and *"Content"* of the same.

Regulation on Conservation of Wetland - Part 1 of the Regulation concerns *"Purpose, Scope, Legal Basis and Definitions"* (**articles 1** and **2**).

2. Types of protected areas provided for in national legislation and classification criteria.

Protected area designations, as defined in **article 2** of the 1983 National Parks Law, include the following:

- **National Parks**

The pieces of nature that, from the aspects of science and aesthetics, possess nationally and internationally rare natural and cultural resource values as well as areas of preservation, rest and tourism.

- **Nature Parks**

Parts of nature that have the features of a flora and wild life and which are suitable as a resting place for the public and their being entertained in an integrated scenario.

- **Natural Monuments**

Parts of nature that are protected within the scope of national park principles and possess the features of nature as well as the qualities that events of nature create besides scientific value.

- **Natural Conservation Areas**

Parts of nature that carry importance in terms of science and training and which include rare, and/or endangered ecosystems, species and natural events that are required to be preserved and reserved for only scientific and training purposed utilization.

- **Specially Protected Areas**

These areas are established pursuant to **article 6** of Law no. 5491/2006.

- **Wildlife Reserve Areas**

They are areas which are reserved in order to protect the game and wild animals whose populations are decreasing, in their natural environments with their habitats without influencing the ecosystem characteristics.

- **Wetland Areas/Ramsar Sites**

These areas are defined by **article 4** of the Regulation on Conservation of Wetlands.

- **Natural Sites**

These areas are defined under **article 3** of the Law on conservation of the cultural and natural heritage.

- **Conservation Forests**

Article 23 of the Forest Law defines these areas.

- **Genetic Conservation Areas**

These are the areas exhibiting rare or endangered habitats, unique ecosystems, protected by legislative status in national level.

- **Seed Stands (Gardens)**

There are quite many criteria in selecting the areas proposed by different organizations and institutions throughout the country to be declared as SPAs.

3. Internal organisation of protected areas. Institutional subjects in charge of protected areas' management.

Various institutions, ministries and organizations have undertaken duties and responsibilities for conserving biological diversity. There is no overall coordinating system for conservation activities in Turkey. While the Ministry of the Environment creates policies, planning and co-ordination for environmental protection, some other institutions and ministries such as Ministry of Forestry, Ministry of Agriculture and Rural Affairs, Authority of Specially Protected Areas carry out implementation activities.

On 8th may 2003 the Ministry of Environment was merged with the Ministry of Forestry with Law no. 4856 (the new Ministry was named "Ministry of Environment and Forestry"). According to article 2 of this Law, the new Ministry is commissioned with, *inter alia*, monitoring developments carried out at international level, coordinating and cooperating with other organizations and institutions. The Ministry is also the main organization responsible for the identification, planning, conservation and management of protected areas, protected by the Act of National Parks and the Act of Land Hunting. The General Directorate of Forest and Village Affairs conducts various projects concerning forest villages.

Determination, planning and management of protected areas are carried out by the General Directorate of Nature Conservation and National Parks, which is also is vested in the responsibility of identifying the species to be conserved, managing wildlife, making the legal arrangements regarding the management of wildlife, issuing hunting licenses and regulating hunting. The General Directorate monitors hunting activities through the Central Hunting Commission composed of central and local units of the Ministry, and associations for hunting and marksmanship.

The Authorities of Specially Protected Areas (ASPA) are attached to the Ministry and responsible for the protection, planning and management of 13 Specially Protected Areas (SPAs). At the local level, governor's offices are in charge of regulating the SPAs.

The Ministry of Culture and Tourism monitors the protection and management of preservation sites designated as such in accordance with the Act on Governing Preservation of Cultural and Natural Resources. The Ministry designates and preserves the natural, historical, archaeological and urban sites in order to hand down these natural and cultural endowments to future generations.

As far as Forests are concerned, **article 3** of the Forest Law gives the Forest General Directorate the authority to "*separate, arrange and direct national parks, natural parks, natural monuments, natural protection areas and woody promenade areas to provide scientific research, protect the nature, provide beauty of country, provide possibility for touristy activities, meet requirements of sportive and resting activities*". According to **article 23** of the same Law, The Ministry of Agriculture can designate protection forests and also determine and announce their limits to near villages and counties. Their land registration, arrangement and usage methods with conditions and basis are determined by Ministry of Agriculture. Also, **article 5** gives the Ministry of Agriculture the power to decide about administration and benefit of establishment of a facility in forests, which do not belong to legal persons and arranged by State departments for private aims.

Article 7 of the National Parks Law states that permissions for all activities are granted through the Ministry of Agriculture and Forestry, except for historic and archaeological sites (which come under the jurisdiction of the Ministry of Culture and Tourism);

Article 7 of the Law on terrestrial hunting is called "*Management of Hunting and Wild Life*" and states that the work and operations related with the management of hunting and wild life, fields, hunting grounds, stations and the facilities will be carried out by the Ministry of Environment and Forestry after the opinions of the related institutions are obtained. Hunting is controlled by Ministry of Forestry based on decisions of the National Hunting Commission, the main monitoring body for hunting, composed of stakeholders from local and central government well as well as the hunter associations.

Responsibility for grassland rests with Ministry of Agriculture and Rural Affairs. However, the grasslands within boundaries of forests are among responsibilities of Ministry of Forestry. Ministry of Agriculture and Rural Affairs also has the authority over the use of pesticides and chemicals.

The National Parks Fund has been established under the authority of the Ministry of Agriculture and Forestry, to meet the expenditures incurred in the protection, repair, maintenance, publicity and operation of the facilities located in areas covered by the National Park Law, 1983.

Article 8 of the National Parks Law concerns land-lease permits which expire after 49 years, after which time all facilities should be transferred to the Treasury. It is possible to extend the lease of land to 99 years.

Article 16 refers to protection services and prosecution by forest guards in accordance with Forest Law No. 6831.

Articles 17 ("Establishment of the Fund"), **18** ("Fund Income") and **19** ("The utilization of the Fund") deal with the national park fund.

Penalties are dealt with in **Articles 20** and **21**.

4. Permitted and forbidden activities within the protected areas.

Section 5 of the Nation Parks Law is entitled "*Protection*". **Article 14** "*prohibited Activities*" specifies that "*At places that are within the scope of this Act;*

a) *The natural and ecological balance and natural ecosystem values cannot be disturbed;*
b) *The wildlife canoe be destroyed;*
c) *All kinds of interventions that may cause the characteristics of these fields to be lost or changed along with the acts and operations that may cause problems such as pollution of soil, water and air pollution as well as other environmental issues cannot be carried out;*
d) *Production of all kinds of forestry products, hunting and grazing that may disturb the natural balance cannot be conducted;*
e) *Other than the structures and the facilities that are mentioned in the approved plans and the facilities that are required for the defence systems of General Staff, unless there is a necessity that is final and cannot be avoided in terms of public interest, under no condition shall any facility and structure be built or operated or housing shall be established outside the settlement sites within these areas*".

With regard to forests, the Constitution of the Republic of Turkey forbids actions, which might damage forests. Furthermore, "*offences committed with the intention of burning or destroying forests or reducing forest areas shall not be included within the scope of amnesties or pardons (…)*".

Section III of the Forest Law, entitled "*Protection of Forests*", forbids e.g. to collect forest seeds or any kind of forest flora, medical and industrial plants and gallnut and to get soil or sand for one's own needs without commercial purposes. However, in **article 37** of the Forest law, rights to use forest products is defined.

Also the Regulation on the Conservation of Wetlands provides for water usage, sand extraction and other activities.

Ministerial approval is also required for sand or gravel extraction and for the license for searching and operation of peat from wetland sites.

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AN ICT-BASED PLATFORM TO SUPPORT PROTECTED AREA MANAGEMENT: THE INNOVA APPROACH

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In this section we explore the opportunities provided by the fast development of Information and Communication Technologies (ICT), building on the experience gained while developing our own coordinated set of computer-based tools, which from now on we will refer to as the "Platform".

Notwithstanding the difficulties that arose while trying to put ideas into practice[1], we decided to report on the full design exercise. Protected area stakeholders will probably be inclined to pick up just some bits of our work, and then integrate them in their own design path. Therefore, we thought a richer knowledge base would have better served the purpose.

The INNOVA approach to an ICT-based platform is based on three main assumptions:

- **IC Technologies offer unprecedented opportunities** to supporting the whole management cycle, to fostering collaboration, and to helping build **effective governance for the sustainable development of Mediterranean Protected Areas**.
- the INNOVA Platform should develop as **a computer-assisted network of people and organizations** who are, at different levels, involved in planning, management, and evaluation of Mediterranean Protected Areas.
- we focus on the flows of *information*, *opinions*, *practices* and *decisions* that underpin the **interplay between knowledge and action** standing at the core of Protected Area management.

We tried to provide reference to well known software applications whenever possible, to foster the transfer of practical tools. In this perspective, the Platform draws on three main families of software, whose boundaries aren't however clear-cut:

- **Environmental Information Systems**[2], with the Geographical component being key (yet not exclusive), have gained momentum as they seemed capable to manage the ever growing complexity of information and knowledge about socio-environmental issues;
- **Collaborative Work Environments**[3] build on *Social Software* to allow users to interact and share data with each other, thus being key to networking and possibly leading to the emergence of virtual communities;
- **Deliberation Support Systems**[4], have followed the paradigm shift of planning and management's bias from *decision* to *argumentation*, yet kept a focus on crucial steps where important change is dealt with.

Though open to the integration of manifold modules taken from the aforesaid classes, the INNOVA Platform revolves around a **Content Management System** (CMS), that is, a piece of software running on a server that includes typically a database application and is geared towards generating, editing, administrating, and publishing multimedia contents[5].

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[1] It proved impossible to activate all features, and some ideas were adapted to fit the software packages and general architecture chosen by the computer scientists who were involved in the project.

[2] Usländer, Thomas. Trends of environmental information systems in the context of the European Water Framework Directive. 2005. *Environmental Modelling & Software* 20: 1532-1542.
Fortun, K. 2004. Environmental Information Systems as Appropriate Technology. MIT, *Design Issues* 20 (3): 54-65.

[3] Pervan, G. 1998. A review of research in Group Support Systems: leaders, approaches and directions. *Decision Support Systems* 23: 149159.

[4] Denzer, R. 2005. Generic integration of environmental decision support systems, state-of-the-art. *Environmental Modelling & Software* 20: 1217-1223.

[5] TYPO3 Association. 2007. So what is a Content Management System? Retrieved 12 May 2007 from: http://typo3.com/What_is_a_CMS.1351.0.html

During the design exercise, we tried as much as possible to **look at the Platform from the point of view of potential end-users**, and this approach influenced the way contents have been organized and presented. The full text, publicly available as a section of the INNOVA on line guidelines[6], has the following structure:

- it starts from **Public Access Web Pages**, then moves to a detailed description of
- **user-specific web spaces** (Partner, Manager, and Stakeholder's) and finally turns to
- the integration of **modules** into the Platform, such as the **Sustainability Monitoring and Evaluation Tools**, the **Management Practices Database**, the **Territorial Information System**, the **Guidelines**, the **Communication, Participation and Learning** tools.

Although we follow the same table of contents in this chapter, we will only briefly refer to those matters that are being dealt with in further details in other sections of this publication.

PUBLIC ACCESS WEB PAGES

Public access web pages will host a great share of global INNOVA contents. In fact, dedicated functions and restricted access areas should be understood as delivering facilitation tools to specific users, since most information will anyway be accessible to the general public.

INNOVA Homepage

The **homepage** includes three main features (see Fig.1):

a) an interactive map of the Mediterranean area;
b) a project presentation menu;
c) a project output menu.

The **interactive map of the Mediterranean area** provides a first glance introduction to the context (basic statistics about protected areas in partner countries, biogeographical regions' boundaries, scope of relevant international conventions and networks, *etc*.). Information display might be activated through mouseover effects, whereas clickable links will take users to as many sections dedicated to the INNOVA pilot project areas. The **project presentation menu** should aim at offering an overview of the INNOVA project (objectives, partners, work packages, *etc*.) as well as further insights into the Mediterranean context, and could be organized as shown in Table 1.

Table 1. Main and secondary (drop-down) project presentation menu

main menu	drop-down menu
The INNOVA project	Project objectives
	Partners
	Work packages
	Schedule
The Mediterranean area	Geographical and environmental features
	Threats and values
	PAs statistics and legislation
The INNOVA approach to PAs management	
Links	Environmental Information Systems
	Inter-Governmental Organizations
	Non-Governmental Organizations
	Protected Areas web sites
News	
Search engine	

[6] At the following permanent link: http://www.innovaproject.net/typo3/index.php?id=1146

The **project output menu** will allow visitors to browse through the different results, and download materials as well (Table 2).

Table 2. Main and secondary (drop-down) project output menu

main menu	drop-down menu
INNOVA Guidelines	Introduction
	Planning
	Implementation
	Evaluation and monitoring
	Tools
	Sources
	Glossary
Management Practices database	Search by sector
	Search by ecosystem
	Search by actors
Sustainability Monitoring and Evaluation Indicators database	Search by objectives
	Search by threat
	Search by value

Protected Area web pages

As already anticipated, each protected area joining the INNOVA network will have its dedicated web section, which might be understood as a *showcase* for the results of all activities carried out through the Platform and concerning that area. Navigation would start from a page including, again, an interactive map and two menus (see Fig. 1). Whereas the **protected area interactive map** will mirror the structure of the similar object we described in the homepage (though transposed to the scale of each PA), the menus will be significantly different. The **protected area presentation menu** will provide an overview of the geographical and environmental features of the area, together with other functions that might be subsumed in the *information* concept (Table 3). On the other hand, the **protected area community menu** will foster *communication* between managers and other users by gathering all interactive functions (as in Table 4).

Fig. 1. Outline of Protected Areas dedicated homepages

Table 3. Main and secondary (drop-down) protected area *presentation* menu

main menu	drop-down menu
The INNOVA network of Protected areas	Project objectives, Partners and short summary of activities
	Links to other INNOVA PAs
The Protected Area	Geographical, environmental and socio-economical features
	PA's statistics and legislation
	Threats and values
	PA's Management Pla n
	Read about PA's good practices
Reports on the state of the PA	Non-INNOVA reports (official Reports on the State of the Environment, Agenda21 reports, EMAS/ISO 14000 statements, etc.)
	Rapid Appraisal Report
	Monitoring Reports (2007, 2008…)
Links	Other PAs in the surrounding region
	Official PA web site
	Other PA-related web sites
News	
Search engine	

Table 4. Main and secondary (drop-down) protected area *community* menu

main menu	drop-down menu
PA Territorial Information System	
Community Survey	Fill in the on-line questionnaire
	Download the questionnaire
Join the PA Forum	
Ask the PA manager	Use the taxonomy to start a new request

USER-SPECIFIC WEB SPACES

Full participation in INNOVA activities operated through the Platform will be subject to a registration procedure. This step is meant to help different typologies of users find easily their way to the Platform functions they actually need. At the same time, it is an unavoidable precondition to the effective governance of the Platform.

Four registration profiles have been foreseen:
1) public,
2) project partners,
3) protected area managers,
4) protected area stakeholders.

The "public" profile will not require any registration procedure, and the contents that will be publicly available have already been described in the previous section.

Partner web space

By signing in as "project partners", users will be enabled to perform a broad range of activities either in the general interest of the project, or at the level of the country they represent. Under the first category, for instance, they might feed their share of cases in the *Management Practices Database*,

contribute to the *Guidelines* contents, add *indicators* to the database, and so on and so forth. Under the second circumstance, they might play a coordination role that stretches beyond the original project completion date, by posting translations into their own languages of relevant project documents, or by launching country-wide initiatives of interest to both PA managers and stakeholders (such as information campaigns on national funding programmes, or surveys).

The *partner web space* will be the only one offering **a backstage perspective on the Platform architecture**, since partners will enjoy the highest permission level to implement, activate and manage the basic tools enabling other users to perform the desired functions.

As a very coarse-grained description, we might think of partners as *administrators* of specific sections (be that *language-specific*, or *topic-specific*) within the Content Management System around which the whole Platform revolves. Further details are strictly depending on the chosen ICT solution, and could therefore be clarified only with respect to actual implementations of similar tools.

Manager web space

Manager web spaces are likely to become both the most popular and the most complex, given the crucial role played in PA management by their potential users. A preliminary overview on what they might include is portrayed in Fig. 2.

SCHEDULE menu

Under the "schedule" menu, users would be prompted to contribute information and take actions, according to a **self-defined timing** and consistently to the INNOVA **management cycle model**.

For the sake of interoperability with other management models (either explicit or implicit) that have already been developed, or are likely to emerge in the context of INNOVA, we decided to reduce the complexity of activities concerning Protected Areas to three categories only: Planning, Management and Evaluation. It is our opinion that other, more refined models, might be easily traced back to these three general headings.

Fig. 2. How the PA manager intranet interfaces could look like, by stressing the different logics of the two menus that have been envisaged.

Besides offering shortcuts to all other platform contents (the *Guidelines*, the *Management practices database*, *etc*.), the SCHEDULE menu will rely heavily on two families of software.

Document Management Systems are used to track, store, retrieve, share and edit in a consistent manner all documents relevant to a certain organization or project. Though these tools have become quite common (see, for example, the *Knowledge Tree*, also available as an open-source freeware at www.knowledgetree.com), the CMS at the core of the Platform should be already able to perform this function.

Project Management Tools have been developed to tackle the problems arising from operating large projects, as well as running complex organizations. They commonly cover scheduling, cost control and resource allocation, quality assurance, workflow management, and communication (check for example the open-source freeware DotProject at http://www.dotproject.net).

DASHBOARD menu

Under this heading we would gather a series of shortcuts to help managers navigate through the different contents and find relevant assistance to implement a specific management process. Dashboards play a crucial role in our Platform design exercise. They should be understood as **integrated web environments where interrelated Platform components deliver a certain function**. In the following sections we briefly describe four such environments.

"Monitoring" dashboard

By clicking on the "Monitoring" button, PA managers will enter an **integrated web environment** (see Fig. 3 for a simulation of what they may look like) that has been designed to help them make the most out of the INNOVA Platform, while addressing the issues of monitoring and evaluation in general. This environment will include:

- **Monitoring document repository**, to store and easily retrieve all relevant documents (monitoring reports, list of selected indicators, *etc*.);
- Links to the **guidelines'** sections dealing with *monitoring*;
- Shortcut to the **management practices** database, by means of an automated query using relevant keywords by default;
- **Surveys**, enabling managers to fill in the ***manager*** **questionnaire**[7], as well as to edit and activate the *stakeholders* and *community* online questionnaires, which would then be administered respectively in the "Stakeholder web space" and in the "Protected Area web pages" dedicated to his/her PA;
- **Selected Indicators**, a list and a ranking of relevant indicators provided on the basis of the responses given by the manager, stakeholders and community in the respective questionnaires[8];
- Shortcut to the **Territorial Information System,** to check status and trends of indicators.

"Territorial Information System" dashboard

- Shortcut to the **guidelines'** sections dealing with *Territorial Information Systems*;
- Shortcut to the **management practices database**, by means of an automated query using relevant keywords by default;
- Direct access to the **Territorial Information System** of that specific PA with full rights to edit and change settings.

[7] All foreseen under the INNOVA PASEM Procedure (provide cross reference in this publication).
[8] Each time an indicator is referred to, links to its metadata file and to the GIS layers showing related information should be added.

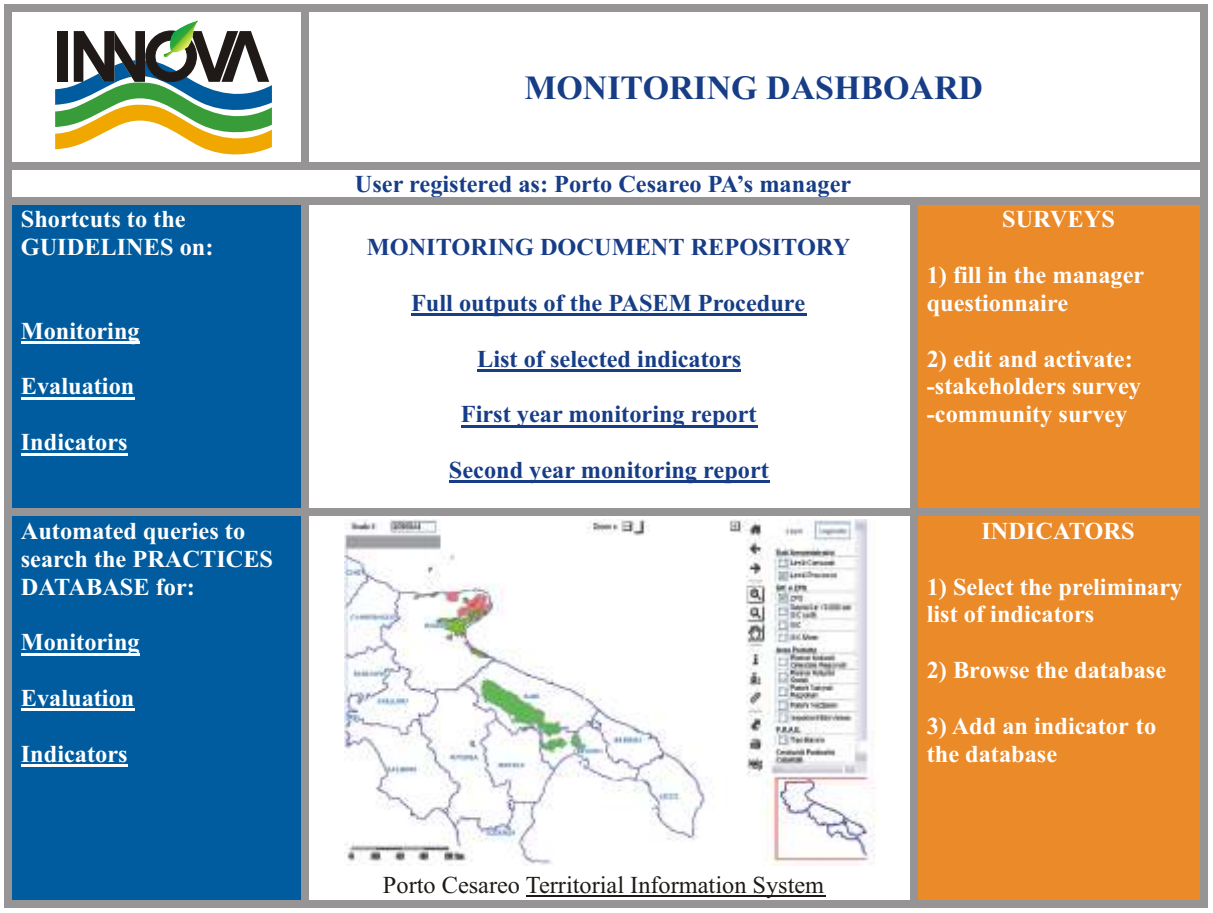

Fig. 3. Outline of a "dashboard", an integrated web environment supporting users in a specific management function (in this case, monitoring and evaluation).

"Participation" dashboard

- Shortcut to the **guidelines'** sections dealing with *participation* and *governance*;
- Shortcut to the **management practices database**, by means of an automated query using relevant keywords by default;
- **News editor,** to publish on specific PA web pages;
- A **Forum** tool, which can be activated/deactivated on demand in the web pages dedicated to specific PAs;
- **Special Surveys**, to be launched on the public web pages.

"Personal Toolbox" dashboard

This dashboard is by definition the less standardized one, as we have introduced it to let managers integrate their own ICT tools into the INNOVA project. It is likely that such tools would fall in either one or the other of the following categories:

- **General purpose software** (such as email services, contacts organizers, accounting software, groupware, *etc.*)
- **Special purpose software** (such as ecological modelling software-e.g. *ecopath with ecosim* at www.ecopath.org, or the wide array of ecosystem-based management tools listed at www.ebmtools.org).

Stakeholder web space

The stakeholder web space structure is similar to the manager's one, providing both a "schedule" and a "dashboard" menu (as in Fig. 4). These menus are more difficult to define since several functions will be activated at manager's request to involve stakeholders in PA management (e.g., contribute to the monitoring plan by filling in the stakeholder on-line questionnaire). Rather than ensuing from a strictly hierarchical take on PA governance structure, this approach is justified

pragmatically by the persuasion that synergies among managers and stakeholders are key to good practices, and that the willingness of the former is usually the most important limiting factor in developing collaboration. Hence, participation modes should first and foremost suit the manager's needs. However, to prevent a bottleneck effect, we think that certain tools should be available by default to stakeholders (e.g. the *Territorial Information System*, the *Management Practice Database*, and most importantly, a tool facilitating communication with the manager, such as a *Citizen Relationship Management* function). Moreover, stakeholders need to get in touch with each other (which then entails at least that the list of stakeholders should be publicly available) in order to start bottom-up activities. To that purpose, they should be able to activate certain tools (such as a ***stakeholder forum***) autonomously.

The "SCHEDULE" menu would mirror its homologous that we have already described in the manager section, though of course it would focus on getting information on, and contributing to, planning, management and evaluation activities.

The "DASHBOARD" menu, as already mentioned, will have a variable structure depending on the participation strategy chosen by the manager. Active dashboards will also look different than their manager's counterparts, as most functions will be available selectively to certain users, according to the permissions administered through an *Authentication, Authorization, and Accounting system*.

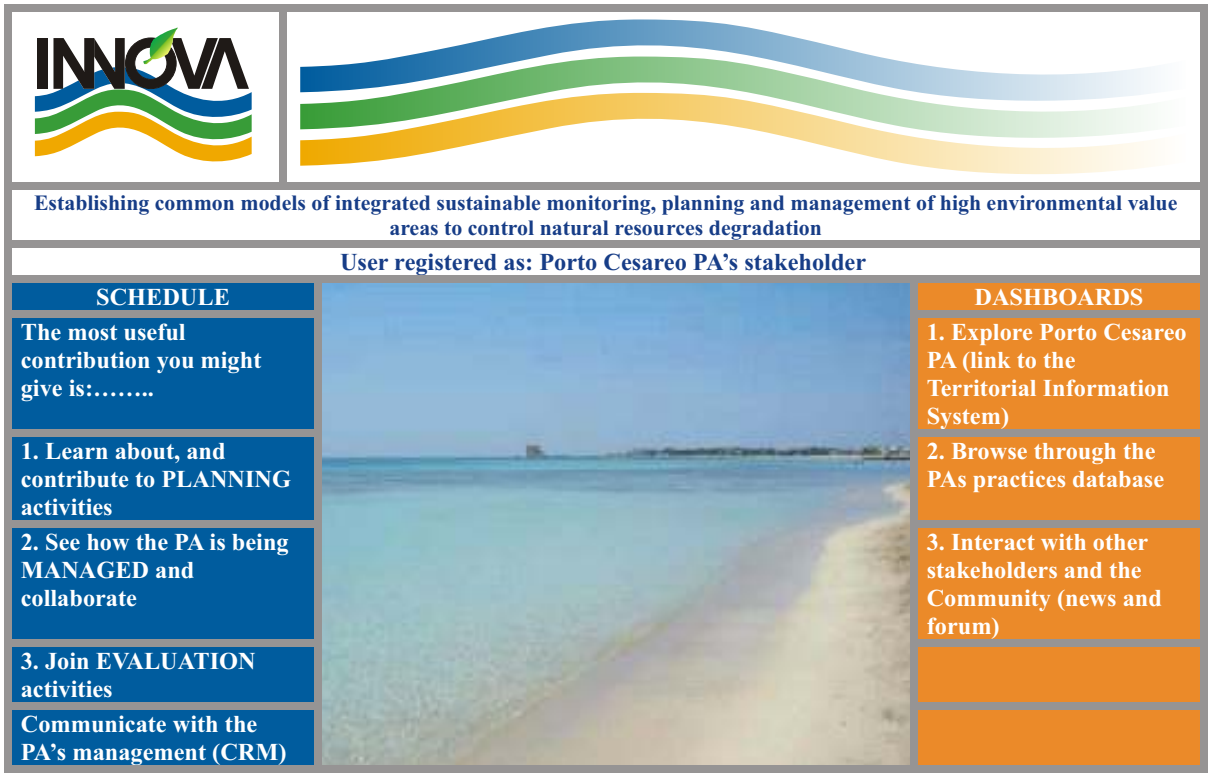

Fig. 4. How the "dashboard" and "schedule" menus could be presented in the Stakeholder web space.

Unlike for manager web spaces, we have thought of putting the shortcuts to related areas of the guidelines under the *schedule* menu, so that stakeholders might somehow play a "watchdog" role in assessing management activities against the background of INNOVA guidelines.

PLATFORM MODULES

In the INNOVA guidelines (available on-line as a *wiki* at the following permanent link: http://151.11.24.150/wiki/index.php/Main_Page) we have worked out in details the core modules operated by the Platform. It is understood that an ICT platform to support PA management is flexible by definition, and other implementations might of course drop some of the modules we chose, and activate others. As for this brief account, we would like to recall some central features of the modules, with special regard to their interoperability and their links to the general architecture we have described in the previous sections.

Sustainability Monitoring and Evaluation Tools

One of the main task assigned to the Platform is assisting PA managers in drawing and following up an *evaluation and monitoring plan*.

Different types of participants should be able to perform the required actions through the Platform. For instance, all forms of **Rapid Appraisal Questionnaires** (for Managers, Stakeholders and Community), should be administered on-line, and the results stored on the INNOVA servers. Moreover, the Platform will host the **Indicators Database** wherefrom the building bricks for the aforesaid plans should be drawn. Finally, all registered users (partners, managers, and stakeholders), and the general public alike, will be prompted to contribute and/or take the lead in the fulfilment of this task through specific links in the respective **web spaces**. Each indicator is complete with a metadata file, that is, a set of "information about the information" helping users understand what the indicator is for, how it should be measured, and how the data should be interpreted.

Since both the *Rapid Appraisal questionnaires* and the *metadata file* include the same "Values" and "Threats" fields, it will be possible to create links between the responses given for a certain protected area and a subset of indicators. Indeed, dedicated software will track these links, producing a list of all indicators containing in their metadata file a reference to the same threats and/or values that have emerged as relevant for that protected area. It goes without saying that each response might activate several indicators, and conversely, each indicator might be activated by more than one response. The **preliminary list**, automatically generated by this Platform function, will therefore consist of a **set of indicators** that, according to the responses given by the manager and stakeholders of the protected area, address its most important *threats* and *values*. Moreover, the list will be annotated with the **frequencies** with which each indicator has been selected, and the **metadata** files. Under the PASEM procedure, such preliminary list would be fed back to the manager and stakeholders, who will participate in a further **Stakeholder workshop** for the identification of a final set of indicators and a monitoring/evaluation strategy.

Management Practices Database

Placing "good practice" at the core of cooperation initiatives has become an undisputed feature at both international and national levels, and in fields as diverse as environmental management and medical care. Given the wealth of existing sources of information, INNOVA further contribution goes along two parallel directions:

1) facilitating user access to relevant information in existing databases, **to broaden the general knowledge base**;
2) dwelling more in depth on very specific management practices, planned or carried out exclusively in INNOVA sites, **to maximise mutual learning among project participants**.

As for the first track, besides providing links to other known and trusted databases, we thought of a **metasearch engine** to enable the easy identification of interesting cases from as many sources as possible. The idea behind a *metasearch engine* is to create a common query form that would allow information retrieval from different databases. The effectiveness of such a tool relies heavily on the standardization of the databases to be searched, as in the case of Libraries' On-line Public Access Catalogues (OPACs), where indeed metasearching now represents a common feature. An example in a more related field can be found in the *Costal Portal* (browse at http://www.encora.eu/websearch.php) developed under the EU-funded ENCORA project.

Whereas the differences among the three kinds of practices we have foreseen are explained in chapter (INNOVA Protected Area "Management Practices Database") we stress that a web interface will allow searches in most fields, though *key words* will be as often as possible standardized through the development of a *taxonomy*. Only project participants (partners, managers and stakeholders) will be able to perform data entry and full search, whereas both *relevant* and *INNOVA practices* (but not *argumented* ones) will be publicly available.

Territorial Information System

As the INNOVA platform is geared towards supporting the planning, management and evaluation activities in protected areas, it must include a computer system to integrate, store, edit, analyse, share, and display **geographically-referenced information**. For this reason, the INNOVA platform will be provided with both a Geographic Information System (GIS) and a WebGIS.

According to the rationale behind the design of the INNOVA platform, which consists in optimising the links among different modules to enhance the relevance of knowledge, methodologies and practical tools, a series of interactions may be envisaged (Fig. 5).

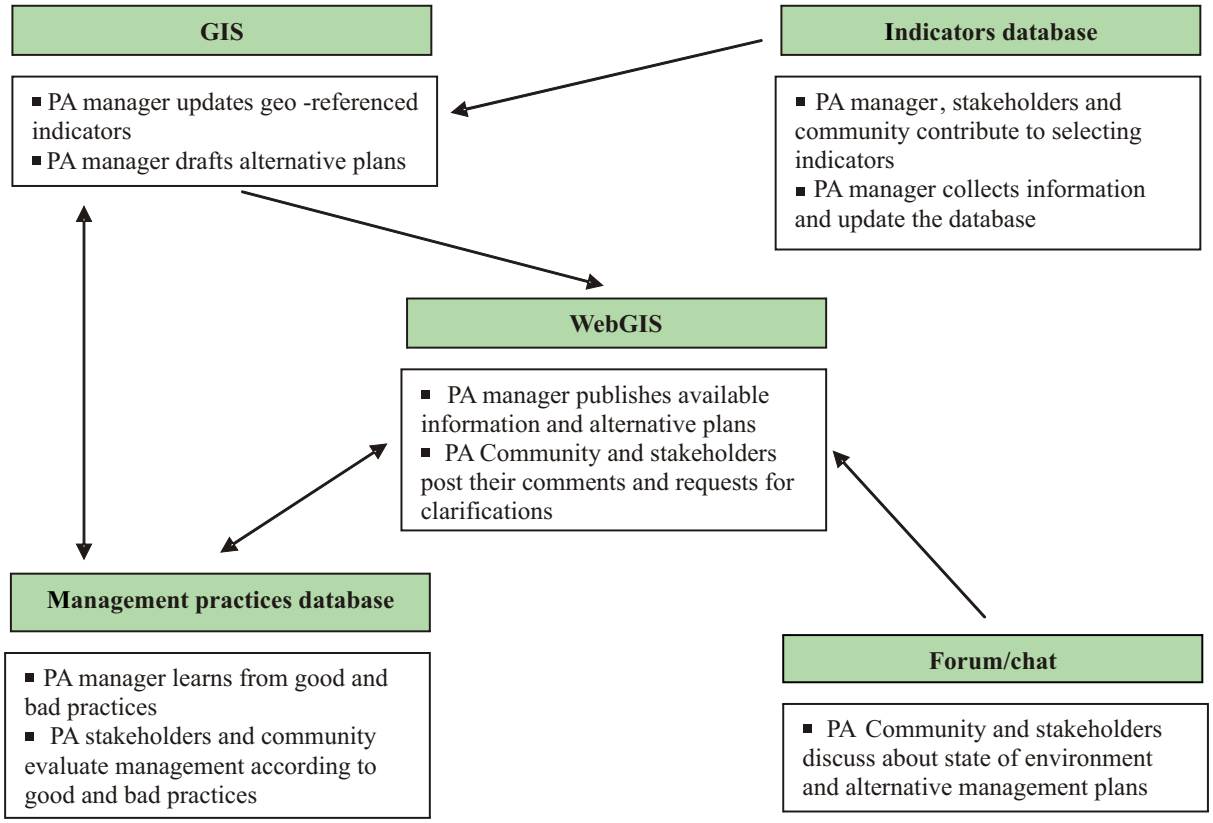

Fig. 5. Possible relationships between the GIS and other INNOVA platform modules

Guidelines

The INNOVA guidelines have been deeply intertwined with the Platform since their very inception, as we aimed at making knowledge available when and where it was supposed to be actually needed by users, that is, in the daily practices of protected area management. The Guidelines are available as a complete set of contents on public access web pages, so that a wide readership might get to use them (browse at: http://151.11.24.150/wiki/index.php/Main_Page). Though we opted for the free software MediaWiki, other approaches might be tried as well, starting from Content Management Systems (such as TYPO3) that can easily handle this task. The key features enabling a deep integration of the guidelines into the Platform are **search paths** that might be launched from different locations (*web spaces* and *dashboards*) and cut across the broad "**areas of contents**", Partners shared responsibility for creating original contents, by accessing the guidelines in *editing mode*. As for project sustainability over time, conditions for Platform operativeness are likely to require a moderate commitment on the side of those who will commit themselves to extending network activities. Provisionally, we can imagine that partners might take care of major additions, revisions and updates, whereas PA managers might contribute minor updates, especially of the like of application examples, in the form of *open content boxes*. A full content DVD-version could also serve demonstration purposes, or compensate for lack of broadband network connections in some areas.

Communication, Participation, and Learning

In the on-line guidelines readers might find a section on a heterogeneous set of tools that have been grouped for a number of reasons:

1) they are all centred on *interaction* among different project participants and other interested parties;
2) they represent the most commonly used class of ICT tools, therefore readers will already be more or less familiar with them;
3) we are arguing for a flexible approach to a diverse family of tools, and different combinations might suit better specific contexts and requirements.

In the following paragraphs we will briefly cover only those issues and tools that have been quoted in this document[9].

An *Internet forum* is a web application that enables discussions by managing *user generated content* (see http://www.sustainabilityforum.com, or http://www.encora.eu/forum/index.php for two interesting examples). Many other terms are used to mean more or less the same thing, namely *message boards*, *discussion boards*, (electronic) *discussion groups*, *discussion forums*, *bulletin boards*. *Forum* and *Board* may refer to the entire community or to a specific sub-forum dealing with a distinct topic. Messages within these sub-forums are then displayed either in chronological order or as threaded discussions. Forums differ from *chat rooms* and *instant messaging* because they allow asynchronous communication (i.e. participants do not have to be online at the same time). Moreover, forums are meant to deal with one topic of (relatively) general interest, and personal exchanges are typically discouraged.

Electronic mailing lists and *newsgroups* are also frequently used to serve the same purpose of allowing group discussions. Mailing lists automatically deliver new messages to subscribers, while forums require them to check for new posts on a dedicated website. However, since members may miss replies in threads they are interested in, *e-mail notification* feature (whereby members can choose to be notified of new posts in a thread) and *RSS feeds* (that allow members to see a summary of the new posts using *aggregator software*) can be useful complements. In *newsgroups* additional software, a *newsreader*, is required to participate, whereas visiting and participating in forums normally only requires the web browser.

Wikis, unlike conventional forums, extend content manipulation to all (registered) users, a privilege usually reserved for moderators or administrators on most forums. Wikis can be an interesting alternative to traditional forums whenever the purpose of discussion is working towards collaboration, and in particular enabling collaborative writing of a text (an action plan, a shared scenario, *etc*.). They also proved a powerful and innovative tool in designing and maintaining complex knowledge repositories (as in the case of http://www.encora.eu/coastalwiki/Main_Page), which is the reason why we chose this media for our own guidelines.

Under INNOVA, it is likely that either partners or managers will act as *administrators*, and therefore will be in charge of editing, deleting, moving or otherwise modifying any thread on a forum-like tool. Administrators also usually have the ability to close or modify the board, change major software items, change global skins, and ban, delete, or create members. *Moderators* have some of these powers (including editing, deleting, warning members for offences, and changing minor forum details), but they may also typically enliven the discussion by posting thoughts-provoking messages. PA stakeholders might initiate and moderate forums.

Moving beyond the relatively basic functions of the tools we presented above, C*itizen Relationship Management* (CiRM), signals efforts to transfer to the public domain the experience gained in the private sector with channelling the interaction between corporate actors and customers through IC technologies. Customer relationship management, the model CiRM derive from, may be described as computer-assisted, web-based systems based on three core principles:

- improving accessibility of services,
- transforming a department-based organisation into a customer-centric one
- delivering innovation in services.

[9] Whenever not specified, information and in particular definitions used in this section are taken from the English version of wikipedia (http://en.wikipedia.org/wiki/Main_Page).

However, the translation of concepts, methods and technologies to the public realm shouldn't be done uncritically. Among the most relevant issues that have been raised on the subject, we might underline the need to set co-production and citizens' empowerment as the core objectives for renewed governance functions. How moving to such a citizen-centric approach is far from an easy task, has been plainly rendered in Fig. 6.

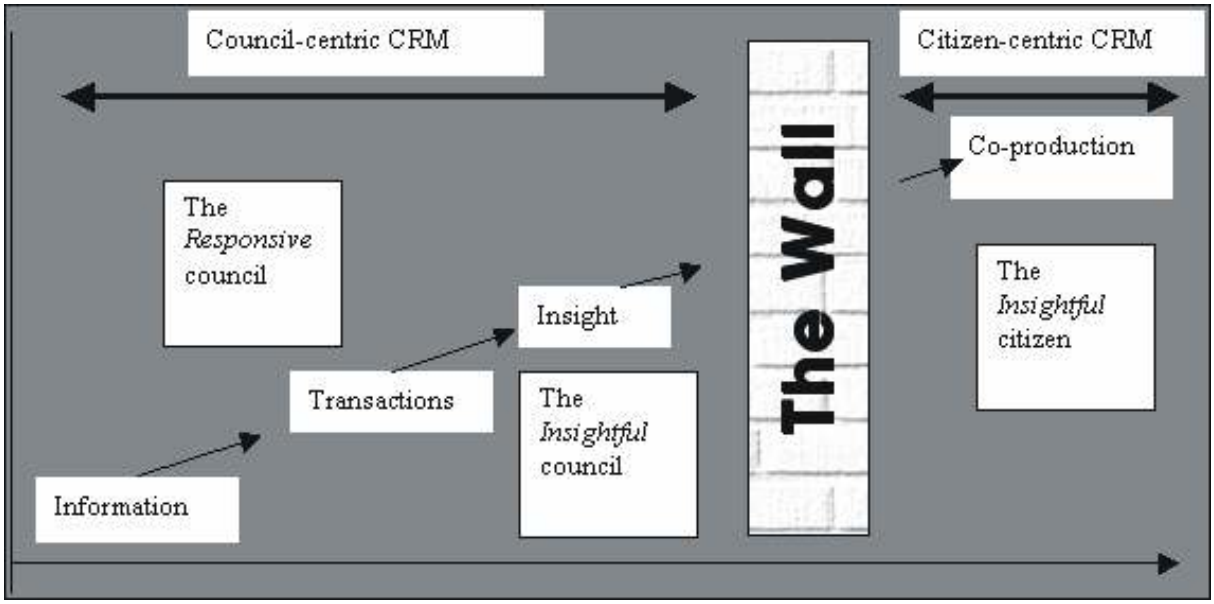

Fig. 6. Stages of Citizen Relationship Management. (Adapted after King, 2005; see reference in the text).

The author[10] has described three stages in what he considers a progressive development towards better CiRM and he labelled them by the type of entity there are centred on:

1) the *responsive PA management authority*[11]

CiRM falling in this class are based on informational/transactional relationships as they try to provide efficient responses to citizen enquiries (enabling appointments to be booked, payments received, benefits paid *etc*.).

2) the *insightful PA management authority*

This is the aspiration of many local authorities and it can already be considered private sector CRM "best practice". The main feature of this kind of systems consists in local authorities learning about citizens' needs and aspirations, so that services and policies can be customized and delivered efficiently and effectively. It is still, clearly, a management authority-driven approach. A widespread tool falling into this category is the 311 phone number for government information and non-emergency services (see, for example, http://www.nyc.gov/html/doitt/html/about/about_311.shtml).

3) the *insightful citizen*

Here the departure from business-oriented models becomes sharp. Extensive citizen access to information and systems, for example, via web-based community portals linked to Geographical Information Systems, should enable citizens to find out more about local services (and their performance) and to challenge management authorities to improve performance, through greater citizen involvement in planning, implementation, and evaluation.

[10] King, Stephen. 2005. *Citizen Relationship Management: The Rocky Road from Transactions to Empowerment*. Policy Dialogue International Limited/eGOV monitor/, document retrieved 20 June 2007, from: http://www.egovmonitor.com/node/1055

[11] We substituted "PA management authority" for the original "council", as we counted on the similarity, within the scope of the article, among different kinds of kind of government agency or local authority.

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DEVELOPMENT PROCESS AND CURRENT IMPLEMENTATION STATUS OF INNOVA COMPUTERIZED PLATFORM

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INTRODUCTION

"*Individuals, groups, organizations, cities, are all examples of social systems, i.e. live systems that have common evolutional characteristics. They all show a native tendency to produce new knowledge (new behavioural and development models) to evolve together with the context: in other words, to survive*". They are learning organizations that generate a knowledge development process.

In most contexts where process results are immaterial or created from immaterial artefacts (ideas), knowledge is a critical production factor, because development of ideas is human centred and because the development process products are destined to be used by man to enforce his capabilities in every application domain. We can therefore state that, along with what is present over the web, that "*available coded knowledge does not exist to be passively learnt by individuals. Knowledge depends on the context it is produced in. also, if it is acknowledged that knowledge must be created, it depends from who has created it and from the process that uses it.*"

Knowledge Management (KM) is an emerging discipline that allows capitalizing intellectual assets of a group, an organization or other. It focuses on the individual seen as an expert with shareable knowledge. Also, the individual's tacit or explicit knowledge is further supported by another important factor, i.e. the individual's or group's experience.

In order to capitalize the intellectual assets, KM suggests various approaches. They all have a common goal: improve **socialization of knowledge and experience** as manner to support present and previous knowledge.

KM can be considered a strategy for preventing those risks that are often ignored and that are noticed within global development, such as:
- lack of knowledge and very long learning times;
- repetition or errors and revision of work;
- loss of personnel that own primary knowledge;
- difficulty of sharing obtained results.

Knowledge can be transferred in two ways, through training or practice. The first solution is costly and may not cover the local knowledge. The second is risky in that it may cause repetition or errors.

KM requires work and resources along with the development of a "system" for carrying out knowledge management activities. The documents that are produced during a project collect the knowledge from the solution of problems related to the project itself. Such documents can be reused to solve other project problems. All the collected information should be stored, analyzed, synthesized and revised to produce patterns, heuristics, best practices, estimation models and guidelines. Finally, through specific communication channels, a group of people should be able to benefit from the collected experience and reuse it.

In the past ten years IT professionals all over the world have assisted to an important phenomena known as Global Software Development (GSD) as consequence of the outsourcing and off-shoring practices. In spite GSD is an interesting practice in that it allows benefits such as a global pool of resources, reduction of development costs, around clock production cycles, we cannot say that GSD is a silver bullet for the success of a project. Rather, during projects/collaborations the above benefits become numerous challenges such as: project set-up, monitoring of work in progress, problems deriving from time, geographic and cultural differences. All these issues may become serious handicaps that require attention and development of specific techniques and technologies for facing and overcoming them.

In other words, GSD expects projects to be carried out in a collaborative manner having responsibilities divided among the collaborating groups which:

- are managed autonomously
- belong to different working groups, each with a specific responsibility;
- work in geographically distributed sites.

INNOVA intends transferring experiences of GSD in managing knowledge scattered across the globe. Information and Communication Technologies (ICT) that make up the platform described in this document represent the Infrastructure for collecting and organizing the contents needed to build the contents of a virtual community.

A virtual community is intended as a flexible production system made up of groups and individuals that differ for type of production and/or localization. A virtual community is a system in that its members cooperate to strengthen their competitiveness and to improve their value chain. A support for such a community is represented by traditional communication tools such as:

- FAQ: are used when the concept to search is clear in mind;
- Forum: is used when the user is aware of the problem he wants to solve, but is not able to define the knowledge he needs;
- Mailing list, Newsletter: information instruments. They become knowledge instruments when the information in the newsletter correspond to what the reader is looking for.

The INNOVA platform, as socialization point, allows to build a virtual community, and disposes of a set of instruments that collect and classify users' knowledge and experience. Indeed, the INNOVA platform is the only access point to knowledge, information and services and it uses both classic and innovative communication and experience collection strategies:

- CRM: used when the issues are not clearly defined. When this strategy is used, the platform consults the knowledge base and according to the question, addresses the request to the most appropriate person;
- Questionnaires: in this case most of the community knows what information it is looking for. Questionnaires are used to question the knowledge base. Acquired experience is formalized according to the information requested and from the knowledge extracted.
- Webgis: it is used to collect and graphically formalize knowledge and experience with the support of thematic maps. With time, new experience is expected to be formalised in new maps.

It is the case to remember that each enterprise of the community has an autonomous management and can decide whether to belong or not to the community.

INNOVA PLATFORM

The INNOVA platform is made up of a set of computers and systems for managing electronic transfer of information with the aim of elaborating existing data and information and producing new and useful data. Within the INNOVA project the platform represents the information system from which and towards which all activities flow.

The primary concepts of INNOVA are: data, information and process. The presence of the information system in the platform is independent from its automation, i.e. some processes and practices exist in spite of their fulfilment in the platform. In this way, we can compare the INNOVA information system to a nervous system.

In this report, information concerning the hardware solutions are not reported, rather we report the information concerning the software systems used and developed and try to illustrate how they are used and for what scope within the IT context. Second, we describe how they have been used and adapted as part of the INNOVA platform. Figure 1, shows the platform architecture.

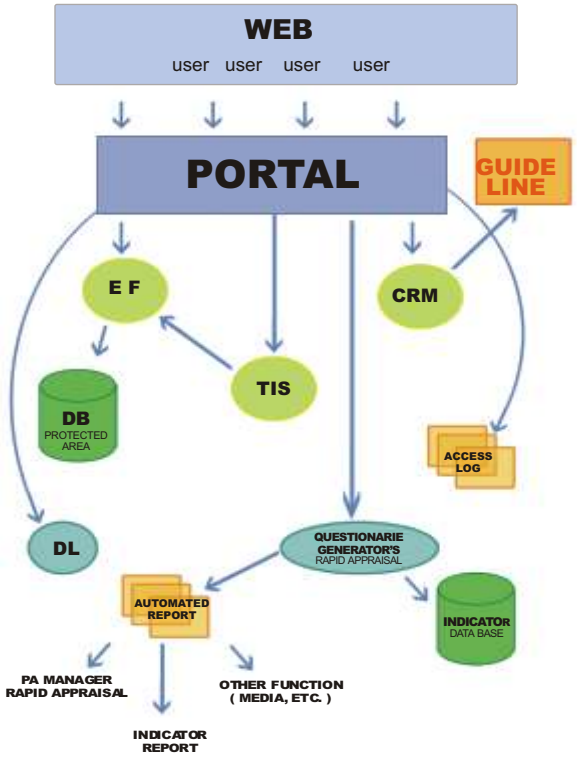

Fig. 1. INNOVA Information System Architecture

COMPONENTS OF THE INNOVA PLATFORM

As it can be seen from figure 1, the INNOVA platform has been designed and developed through components, each with a specific functionality within the overall system. The next section provide details on each part of the system. The components that make up the system are characterized as follows:

1. **Portal**: the web portal is the only access towards all of the instruments and information made available through the platform. The portal is able to discriminate the access to services and instruments according to a user profile management, and through a Single Sign On (SSO) which allows a user to access all of the authorized services after authentication. The portal allows to automatically reuse any type of contents it contains. In some cases this means using up to 90% of the contents. As so, users must only handle 10% of the new contents. Reuse of information is not limited to images and texts, but also ranges from paragraphs of a page to the entire portal.
   a. **Web Search Engine**: a Web search engine is a search engine designed to search for information on the World Wide Web. Information may consist of web pages, images and other types of files. Many search engines are useable on the web. The most used is Google. In the INNOVA project, an internal search engine together with an external search **engine have been implemented.**
   b. **Internal Search Engine**: is a search engine internal to the portal, i.e. able to carry out full-text searches within documents in the INNOVA platform.
2. **External Search Engine**: a search engine able to search information within a set of external websites to the portal has been developed. It uses the same search algorithm as Google. As so, this engine has been developed using the google component that carries out searches and building a wrapper that controls the engine's search domain.
3. **Workflows**: this components automates the process and allows to create and publish both public and private contents. Overall, three activities are identified:
   a. **Building Contents**: the publication process begins when an author creates a page through the portal. The author can define a plan for publishing contents and specify the time range when the contents should be shown.

b. **Approval**: after approving the contents, the portal moderator must approve the page to publish. Moderators must also assure that portal contents are homogeneous.
c. **Publishing**: after approving the page, it is published on the web site. In this phase the time the page should be published for can be defined. Once contents are published whoever accesses the portal can also access the contents. Once the time for publication dues, the page in the portal no longer appears.

4. **Guidelines**: the guidelines management system aims at providing a practical guidance on the development of Management Plans for Protected Areas. Practitioners, policymakers and scientists are invited to use and to contribute by sharing knowledge and experience in protected areas management. To achieve such goal a free distributed wiki, mediawiki, has been used. Some features have also been added to allow content management, file uploads, and integration with the rest of the system. Wiki is intended as a web site managed by something similar to a CMS. So, as for a CMS, it is used for uploading contents on the web. Also, it has a proprietary language so that if tags are inserted in the text, a page that references them is automatically generated. This system allows to quickly develop encyclopaedias that use Hyperlinks. Furthermore, the empty pages that are automatically created by the system can be filled by authorized users.
5. **CRM**: the Customer Relationship Management (CRM) concept is related to customer loyalty. CRM is the set of activities that an enterprise uses to develop, detail and increment relations with their clients. There are various marketing techniques that can be applied to the internet in order to transform visitors in potential buyers. However the aim of CRM is different: it focuses on maintaining commercial relations with its clients although it also tries to establish relations with new customers. In summary, a CRM pushes towards three different and distinct directions:
   a. Acquiring new clients (or “possible clients”)
   b. Increase relations with the most important clients (“tillable clients”)
   c. Maintain fidelity of clients for as long as possible (“priority clients”)

   Based on this concept, a Citizen Relationship Management has been developed in INNOVA, aiming at increasing customer fidelity towards HEVA. This has been done through a meta-model that uses the taxonomy concept with the aim of automatically classifying the requests of a citizen and transfer them to the most appropriate person for answers.

6. **Distance Learning (DL)**: training distributed through information technologies (such as CD-ROM, internet, internet etc), commonly identified as distance learning (FAD), is known as e-learning. Indeed, the internet and/or web component and a specific technology like LMS distinguishes e-learning from other types of distance learning like Computer Based Training (CBT). Furthermore, user monitoring and tracking distinguish it from the Web Based Training (WBT). Definitively, e-learning represents a third generation (or evolution) of distance learning. Within the INNOVA project, e-learning has been used though the CAROLINE platform for providing training courses for HEVA operators and for users that were not actively involved in HEVA.
7. **Access Log**. One of the greatest benefits of Internet consists in traceability of user navigations on a website through web statistics, protecting one's identity. Web statistics depend on the internet infrastructure in that the information collected for each page are transferred from the server of the web site (in our case the INNOVA Platform) to the navigator's personal computer, generating a set of statistics. Thanks to this component in INNOVA Platform, all of the authorized users can see how many navigators access a certain page, which navigation paths they use, which web site they come from, which keywords they have used and so on. This is done respecting the navigator's privacy and assuring his anonymity.
8. **Traditional Communication**: this component is transversal to the entire platform in that it is made up of a set all traditional components for web communication, such as forum, chat, newsletter. This component, along with other ones on the INNOVA platform, have been designed and carried out to be perceived by the final user as integrated with the portal. The mentioned components are defined as follows:
   a. **Forum**: refers to the entire infrastructure containing discussions and messages written by users.
   b. **Chat**: the term chat is used to refer to a set of phone and internet services. These services have two elements in common: real time dialogue, the service allows for two strangers to communicate and remain anonymous.

c. **Newsletter**: a newsletter is a set of written news periodically diffused through email or specific web areas. For what concerns the project, newsletters have been published in specific web spaces in order to avoid that periodical news ended up as spam or fishing without being received.

9. **Experience Factory:** the concept of EF follows from the knowledge base concept. It is a specific type of database for managing knowledge for enterprise, cultural or didactic needs. It makes up a context that simplifies knowledge collection, organization and distribution. An knowledge base of interest for an enterprise usually presents the explicit knowledge of the organization, including what can be used to solve problems and consists in papers, reports, user manuals and so on. A knowledge base should have an appropriate classification structure, have few formats for presenting contents and dispose of a search engine. These characteristics have been taken into account in the INNOVA project, along with other features used for extracting knowledge from acquired experiences.
10. **Territorial Information System:** the concept of TIS is strictly related to GIS, i.e. a geographical information system that allows to acquire, register, analyze, visualize and present information related to geographical data. TIS consists of territorial thematic maps, correlated to specific data banks (for instance water, soil, etc), for the multifactor description of Land. TIS is essential both for planning purposes (evaluation of intervention measures on the territory by the Public Administrator) and for monitoring and managing the areas. Also, as it can be seen the description of TIS in INNOVA beholds the traditional characteristics of WEBGIS, along with a set of functionalities for interacting with the maps, changing them via web without having to use other systems.
11. **Generator's questionnaire:** the scope of motivational questionnaires is to collect opinions and analyze them with statistical methods. Monitoring and the future planning of HEVA has been carried out starting from INNOVA platform through questionnaires used as indicators for the Protected Area (PA) managers. The tool used for the infrastructure that manages questionnaires is phpsurveyor. The tool has been enriched with components for user profiling and for evaluating the questionnaires according to the PASEM logic.
12. **Indicator Data Base**: The function of this platform with regard to indicators is to enable the development and storage of a large set of indicators, which are characterized with specific metadata file information. This database is able to be searched using the metadata contents which in turn are relevant to the data obtained through the PA manager questionnaire and stakeholder questionnaire. This enables the selection of a different set of indicators which are relevant to a specific PA. Below, the nature of the platform is described followed by an explanation of how the manager and stakeholder questionnaire data can be used to identify indicators.
13. **Automated Report**: this module automatically generates all the reports that can be produced with the INNOVA platform. One of the main goals of this component is to produce a report in electronic and paper format according to the Protected Area Sustainability Evaluation and Monitoring Procedure (PASEMP). It is a report which includes the analysed results obtained from the Rapid Appraisal questionnaire. The contents of this report are aimed to enable the PA manager to evaluate his/her sites management effectiveness.
14. **Protected Area DB**: this module has been designed to allow authorized users of the INNOVA platform to create geo-referenced databases over the web, i.e. points on a map where the HEVA are situated. The idea is to contain all the information in a database with the benefit of demanding the management part to an automation engine rather than to the final user. This component integrated with the rest of the portal has allowed to achieve important features. First, the protected areas are directly visible on a geographical map. In a traditional webgis this same result requires a detailed process with specific competences. This does not occur in INNOVA. Indeed, the integration of this component with pmapper (TIS) has allowed to dynamically and automatically create the layers, carrying out all of the steps in place of the user. Furthermore, the information can be inserted in the HEVA databases together with a web interface of the system.

PORTAL

Any web developer has most likely observed that there are many issues related to using static documents along with HTML code. This approach has shown to be winning for small websites but useless for large projects that need to manage large amounts of information with inevitable consequences on content organization and updating. Content management is therefore the process that aims to organize information and manage them according to specific rules.

These have been the main reasons that have led to the development and diffusion of software systems known as Content Management Systems (CMS), i.e. systems for managing contents.

A CMS is a framework for managing contents of different types in order to simplify the introduction, management an publication on behalf of different information “producers”.

CMS have been evolving reconsidering what has been done up to this moment with different aims: understand of there are weaknesses to enforce; and analyze strategic aspects to follow with specific attention. This phase has led to many clarifications within CMS and has led to the development of various frameworks both open source and not, and to the elaboration of a set of best practices for their definition/maintenance.

The portal represents the starting point for creating knowledge allowing for information and knowledge collection and sharing through a combination of contents, processes, human and technological resources.

The portal allows the protected areas (HEVA) to unblock their information and provide users access to such information in a personalized manner for building knowledge (external users) and for decision-making operations (internal users) (Fig. 2).

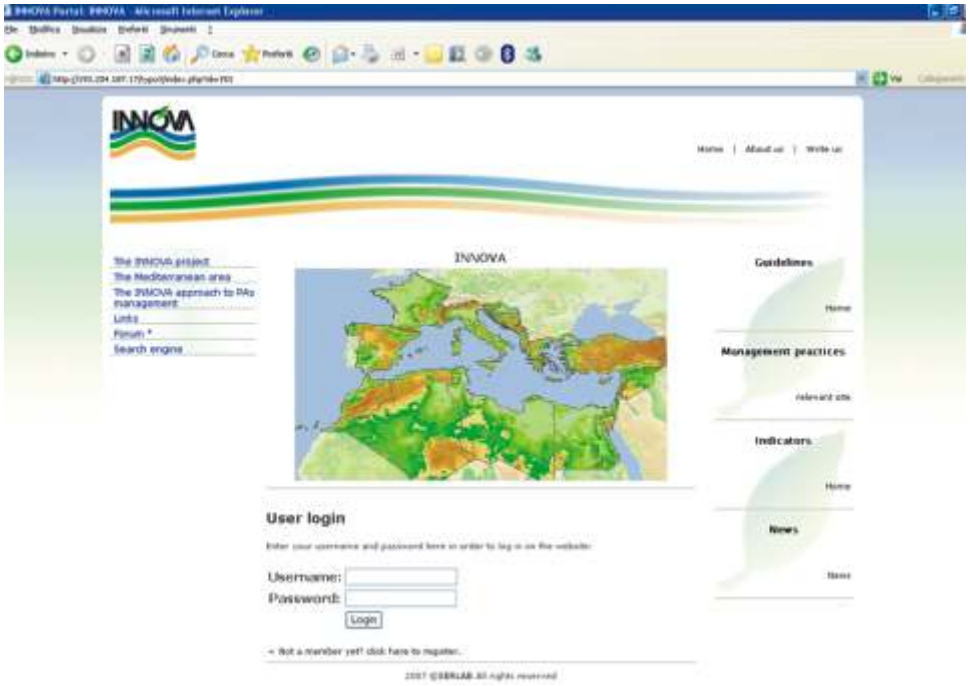

Fig. 2. The INNOVA portal: a shapshot of the homepage

EXPERIENCE FACTORY

One of the issues faced in the INNOVA project, refers to tacit and explicit knowledge management of domain experts that that circulate around the HEVA. This issue has been faced by developing a tool that allows knowledge producers to explicit, package and consult their knowledge. The functions of the system are accessibile via web. As so, the system provides mechanisms for organizing and classifying knowledge, navigating and searching contents.

The primary entity of the system is a package. A package, either knowledge or experience. Is made up of a set of meta-data with a tree structure and made up of the following blocks:

- evidence (EV): experimentations with details and results of the package's validity,
- projects (PR): project details that describe how to use the package.

The EV and PR blocks are always present for each package. Each block is structured as a tree of meta-data. Moreover, the meta-data have been defined in the project according to current knowledge of the domain and divided in the following manner:

1. **The relevant practices**: include the good practices that are expected to work in the Mediterranean protected areas;
2. **The Innova practices**: made up of the practices applied to the network of Innova protected areas;
3. **The argued Innova practices**: include the experimented practices within the Innova protected areas that are intended to be studied with greater detail and monitored in time.

Given a package, it must be able to identify all of the projects it was applied to and the set of evidences it has generated. The main functionalities offered by the system are:

- Update packages, projects and the evidences in the system by inserting new packages, projects and evidences; modify and eliminate existing pones;
- Structure package contents, projects and evidences;
- Update package characteristics through the definition and/or modification of meta-data;
- Consult the resources present in the system through a search engine.

The system has been carried out according to a level architecture for Web applications. It is made up of a Presentation GIU level which corresponds to the user browser, a Logic Presentation level that develops a thin-client web interface; a Business Logic level that provides the functionalities specific to the application and enacts the business logic; a Data Access Logic level that provides services for accessing persistent data, and a Data Storage Logic level that provides services for storing and retrieving persistent data, i.e. DBMS. The technologies used are based on PHP, the application server used is Apache, and MySQL as DBMS. All technologies are of public access.

Applying the knowledge package in the HEVA lifecycle will produce results that can be formalized in order to point out the success of the package's transferability. These measures can be collected periodically, until the package is applied.

From a discussion with the project researchers that it is not always possible to develop packages due to the lack of information and that package production must be gradual. For this reason, and given the low knowledge of events that occur in HEVA, the system was modified in order for it to dynamically adapt to the new needs. In other words, the domain knowledge evolves in time and consequently, the system is able to learn new needs and adapt its structure. All of this is possible because the database used by the system is not bound to a specific structure, i.e. each time new knowledge must be formalized, the system generates the logic database needed to manage the knowledge, in other words the system is able to adapt itself to any context. During the rest of the project, the knowledge base has been enriched with another feature: publication of knowledge on geo-referenced maps.

E-LEARNING

The term Training, refers to an individual development process led by progressive learning of competences, through study and experience. Training should be considered as a way for individuals to acquire capabilities, knowledge and behaviours that will teach them how to face situations. In the past years the evolution of social-economical contexts has increased training requests on both individual and organizational level as contrast to the increasing competition in markets.

All of these changes has, indeed determined changes in many enterprise activities, determining the need to carry out or increase training for managing such changes. Training should therefore be considered as an investment that enterprises cannot ignore.

Experimental training methodologies that have had success in various contexts are listed in the following:

- Pedagogy
- Face to face training
- Analogy models: role games, metaphors, simulations
- Cooperative learning
- Counselling as support to training
- Combined training

GRASS

"Geographic Information Systems (GIS) are information systems for acquiring, storing, controlling, integrating, elaborating, and representing spatial data referred to the land surface" (Arnaud *et al* 1993).

This definition describes the entire information process. **Acquisition**, **storing**, **control** and **integration** refer to the development of a database. More precisely, integration points out the main characteristic of GIS, i.e. their ability of relating data through spatial references. **Elaboration** refers to the goals that must be defined. **Representation**, intended as communication of data, introduces user characteristics.

This is not a unique definition: many others describe GIS as a database containing various types of data, or as a toolbox. This definition relates to current technology trends that organize data in a single relational database, with traditional records, non structured text data like documents, images, sounds, geometric data that make up a map.

As so, a Territorial Information System is an instrument for mapping, analyzing and managing objects and events that occur on the territory. It integrates the traditional database operations as interrogations and statistical analysis with the features of map visualization and geographical analysis.

These capabilities distinguish a GIS from other information systems and make it a major instrument for analyzing events, forecasting changes and planning territorial management strategies.

GRASS is a calculation software oriented towards cartography. This means that apart from visualizing maps (as raster or vectors), GRASS is able to carry out map elaborations for generating new maps and extracting meaningful data. Some examples:

- Providing an altimetrical map and a vegetations, the system provides a forecast on how a forest fire evolves;
- Providing an altimetrical map the system produces a map that point out the areas that are differently radiated from the sun;
- Providing an altimetrical map the system produces a map of docks of a specific dimension and a map with rain water run-offs
- Given a vegetation map the system produces the total surface covered by each single type of vegetation. Supposing to have to identify an area designated to a dump, the system requires as input a set of maps (road maps, hydrographical maps, cadastral maps, altimetrical maps, etc.) the set of constraints, and GRASS will produce a map with all the areas that satisfy the imposed constraints.

The software has been designed and developed according to Open Source criteria. In this sense it is used as a discriminating factor for selecting software to use. Another characteristic is that GRASS allows to develop new capabilities and new interpretation models of the available data. Finally GRASS does not require a proprietary operative system. Indeed it runs on Linux, which doesn't have license fees.

In conclusion the choice of an operative system an of the GRASS software allows to distribute project and research results, assuring access to the data and the possibility of replicating them on behalf of any stakeholder willing to sustain the acquisition costs for the entire infrastructure.

DEVELOPING A GIS

As for all systems, GIS require a phase for inputting data into the system, one for managing and elaborating them, and finally one for communicating the results. Moreover, for GIS systems the three phases can be divided into six parts identified as: acquisition, pre-elaboration, management, elaboration, analysis and presentation (Fig. 3).

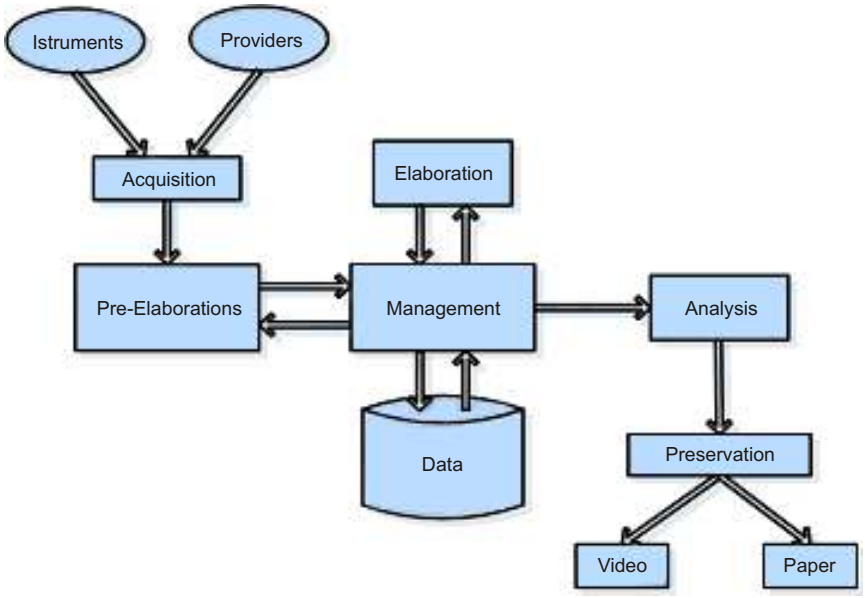

Fig. 3. GIS flowchart

The **acquisition** phase:

- Inserts data into the system in their natural format and transforms them in a format that is directly manageable by the system. This requires using devices (scanner, digital table, etc.)and specific software.
- Collects numerical data from other sources.

The **pre-elaboration** phase is important for transforming data in numerical format into data that are manageable by the software being used. In other words, this phase transforms a set of various data into homogeneous data. It requires operations that, in some cases, are carried out simultaneously to the acquisition phase, as so the two phases cannot always be distinguished one from another.

Data **management** is carried out through instruments like relational Data Base Management Systems (**DBMS**), or **GeoDBMS** for efficiently managing data. After choosing a a GeoDBMS it represents the only way for reading the data from the system or for producing new data.

Analysis and **elaboration** phases refer to the operations that a user carries out for manipulating and transforming data according to specific criteria and for extracting useful information from the data. The operations that the systems are able to carry out are various and depend on the system itself along with the data it refers to. The functionalities available in these two phases can be classified according to various criteria: in the figure the processes that transform data and create new information levels are distinguished from those that that answer questions formulated by users.

Once data have been selected and/or manipulated by the user the **presentation** phase presents the data in paper format or on screen.

CRM

CRM is a business philosophy, an attitude towards clients, supported by processes and systems. The aim is to develop long term personalized relations with clients by understanding their needs and preferences. This definition of Customer Relationship Management concerns enterprises and their overall vision. It is strictly related to a strategy, communication, integration between enterprise processes, people and culture. The client has a central role both in business to business and in business to consumer. In other words, it aims to understand customers' behaviour and tries to improve their satisfaction. The implementation of a CRM process is not easy. The assignment of any service corresponds to the execution of an analyzed and implemented process which is therefore easily automated and reproducible with in an enterprise context.

This system will be activated when none of the other processes or services presented is able to face the needs of the stakeholder. In this case it suggest a set of possible solutions between those close to the user requests.

An example can be the request of information on a specific topic that no other existing process is able to autonomously satisfy. In this case a process between the “requestor” and the “knowledge producer” is enacted. It cannot be formalized but is defined and carried out by the agents involved in the process. Also, this process is not stable in that, each time it is carried out the agent will behave differently according to the context. It is “tacit” and not replicable. In this situation it is only possible to monitor the communications between agents and collect their contents for future use.

A commercial product with such functions is Customer Relationship Management (CRM) which manages communication between Customer (internal and external to the enterprise) and functions of the organization that aim at satisfying customer requests.

In order to achieve all these goals it is necessary that the CRM disposes of a set of characteristics specific for these aims along with other software and hardware aspects. Moreover, the characteristics can be described according to the goals that the CRM must fulfil:

- Scalability: the system containing the CRM must be able to migrate towards more complex and evolved architectures and manage and increase of services and users.
- High integration coefficient: compatibility with HTML and PHP pages: given the need to integrate with other components via Web; Compatibility with MySQL databases: the databases a system can retrieve information.
- Security: personalized access, the system must allow to personalize contents according to the user profile. Various access modalities allow for different types of users: first level (Partner Enterprises), second level (standard user), enterprise staff that manages the system. Protection mechanisms: the CRM system offers various levels of protection related to the contents of the system and to process execution (LDAP, coded passwords).
- Performances: the CRM system offers a high stability without impacting on performances. The system can be configured to satisfy all user requests without slowing down performances or causing malfunctions on the hosting machines in that the system is entirely web-based. It also manages messages and emails for assuring rapid communication between interested parties and enterprises. This type of communication is characteristic of CRM for solving requests that cannot be classified in the existing processes. The system also implements a monitoring component of requests towards all the stakeholders involved in the process. It monitors the requests in their evolution, progress, and state within their lifecycle.

As shown from the experimental results collected in SERLAB, the CRM is a valid solution for assuring interaction and communication between stakeholders. This instrument reduces communication problems that usually characterize workgroups distributed across distant areas.

WEBGIS

WebGIS is a specific type of GIS that allows to access geographical information represented in various formats: maps, data, images, analysis etc.

WebGIS enacts a process where the user, through a Browser, asks queries to a geographical database which manages spatial and non spatial data both dynamically and non statically. As so, the images generated following to a query are carried out as output to the query made on the database and not as existing images in the database (hyperlink to a file).

As so images are always available. Also, communication and productivity are increased. Indeed a WebGIS allows each remote site to access an internal or external database of information. A site can therefore be intended as a place for collective work where the data produced by the Structure are always available in real time.

It can be used by many organizations that use spatial analysis applications in various hardware contexts. As so, a Web-Oriented application is ideal and avoids having to install numerous workstations. Furthermore, it allows to develop applications that run on any PC, along with a high data protection.

CONCLUSION

The platform must be experimented to verify the effectiveness of the solutions it proposes. In other words, experimental results must point out to what extent the platform allows to collect experience and formalize knowledge as well as diffusing it.

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COMMON GUIDELINES FOR PLANNING, MANAGEMENT AND EVALUATION IN HIGH ENVIRONMENTAL VALUE AREAS

" … an online guide for and by protected area managers to provide practical guidance on the development of Management Plans"

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THE INNOVA APPROACH

The INNOVA project features a remarkable diversity in terms of the socio-institutional backgrounds of its partners. At the same time, the issues it aims to tackle cannot be unequivocally defined since they are subject to continuous evolution.

Hence, it might be advisable to go beyond the traditional approach to guidelines as fixed content texts, based on the assumption that optimal courses of action can be defined by a limited pool of experts and then disseminated outwards.

It seems reasonable to consider "one size fits all" approaches as inappropriate whenever social, political and cultural aspects play an important role in affecting implementation. First of all, many stakeholders tend to emphasize the uniqueness of their own case when compared to both general models and specific examples. Secondly, planning, management and evaluation of protected areas[1] is not a linear process, and the logical framework guidelines are going to be built around should be adaptable to users' queries irrespective of topic, stage, or purpose they relate to.

While the environmental management domain is often marked by information scarcity, a condition that would definitely make knowledge dissemination as such a valuable endeavour, other factors also come into play. Notwithstanding gaps in available knowledge about conservation and management problems in protected areas in the Mediterranean region, filling in these gaps seems too ambitious a goal when compared to the resources within the reach of the INNOVA project. Further-reaching institutional initiatives have been established to this purpose[2], which shall undoubtedly constitute a further reference for our project. However, Protected Areas stakeholders often face other challenges, such as coming to grips with unmanageable flows of data, while experts' recommendations collide and claims mushroom. We feel therefore that the INNOVA Guidelines should merely facilitate access to relevant knowledge and its reframing and reworking alike, so that multiple end users can use it consistently for their own needs and goals.

In fact, the processes our Guidelines should assist, that is the cycles of planning/management/ evaluation of "protected areas", require relevant knowledge to be embedded in the individual, group, and organizational practices around such systems. The kind of knowledge we would like to mobilize occurs in the social networks that link multiple stakeholders as they get involved in planning/management/evaluation of "protected areas". Our manual of Guidelines has accordingly been rooted in the very same space of connections.

The INNOVA project proposes an alternative strategy oriented towards generating meta-manuals, that is, tools to help users find their way in the wealth of information and knowledge bases already available.

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[1] To simplify communication, INNOVA partners have agreed to use the concept of "protected areas" as a substitute for the more general "high environmental value areas", fully aware that the two may not always coincide.

[2] To name but a few, the IUCN Centre for Mediterranean Cooperation, the NATURA 2000 and EMERALD networks, the UNEP Mediterranean Action Plan, the UNESCO Man and the Biosphere Programme, the MedWet network under the RAMSAR Convention, and the WWF-Mediterranean Programme.

The INNOVA Guidelines try to do so by:

- fostering the critical capacity of users to identify and interpret relevant sources and
- mapping the self-established paths to writing their own guidelines.

In other words users will be able to make their own tailor-made guidelines by taking advantage of the supportive learning environment developed in the framework of the INNOVA project. Our basic assumption has been to take account of the need to counterbalance centralised selection and validation of relevant content with as many layouts as end users.

Moving the focus away from creating content to creating the facilities and framework for users to publish their own content, somehow echoes the paradigm shift IC Technologies are currently going through, following the emergence of “open content systems” and “user generated contents” (Wikipedia 2007). Practically speaking, such meta-manuals might be envisaged as: nested hyper-texts and customized manuals.

As a hypertext many important assets concerning content management and user-friendliness are guaranteed:

- multimediality
- interactivity
- selectivity
- accessibility and
- updatability

Though it might sound a bit contradictory, after having sung the praises of ICT, we believe printed manuals can still be the best choice whenever users need to dwell on a certain topic in depth, discuss a text within a group, or refer to the guidelines while working “in the field”. Besides providing well established printing functions (which are however based on a “one-size-fits-all” philosophy) it is a good idea to help users create their own manual by selecting out of the hypertext contents only what is relevant to their current, specific, needs, and to print it. Users will be given different download and printing options.

All Guidelines content is available on the public access web pages of the INNOVA platform[3] and managed by the free software MediaWiki (Fig. 1).

Wiki software is a type of collaborative software that runs a wiki system, allowing web pages to be created and edited using a common web browser. It is usually implemented as a software engine that runs on one or more web servers. The content is stored in a file system, and changes to the content are stored in a relational database management system.

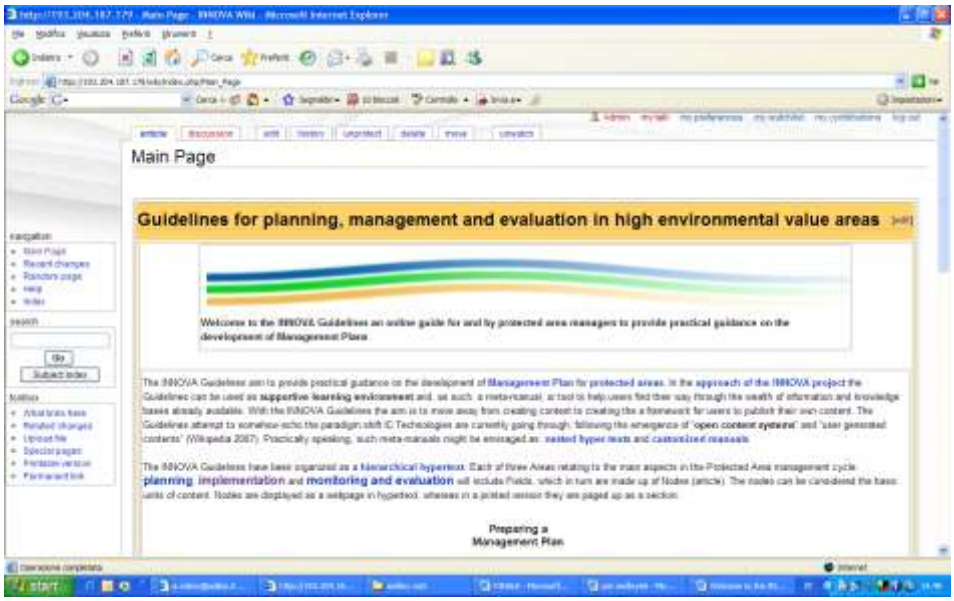

Fig. 1. Main Page of the INNOVA Guidelines (http://151.11.24.150/wiki/index.php/Main_Page)

[3] http://151.11.24.150/wiki/index.php/Main_Page

Partners, and to a certain extent also managers, will be responsible for creating original content. They will be able do so by accessing the guidelines in *editing mode* from the respective web sites. Whereas partners might be responsible for major additions, revisions and updates in all sections of the Guidelines, protected area managers and other registered users might contribute application examples and other content in "open content boxes". As with the wikimedia philosophy, other user contributions will be published automatically, though further checks will be also made by the partner responsible for the relevant content area.

To improve interaction with those involved in the management planning process, the website includes a *forum* ("discussion" area in the screenshot). The hypertext will be the focus of discussion and debate; content will be constantly enriched and updated with reference to current practice.

FORMAT AND CONTENT

The INNOVA Guidelines approach is based firmly on the IUCN management cycle which seeks to ensure that there is continuous learning by re-assessing and re-evaluating the success of management actions, programmes and initiatives (Thomas and Middleton, 2003). In accordance with the IUCN, the continuous management planning process can be considered as cycles with three major phases:

1. Preparation of a Management Plan

2. Implementing Management Plan

3. Monitoring and evaluating Management Plan

Fundamental in this cyclic process is "feedback", which allows the planner to correct for future action in light of past experience. This feedback loop can also be thought of as a "quality cycle", where the monitoring and review of the plan ensures that all parts are appropriate, efficient and cost effective. It is the continuous nature of this process that ensures that the resulting management plan is flexible and can adapt to changing circumstances and is thus of adequate quality.

The reality is that expert knowledge is always incomplete; the extent to which it is incomplete will vary among regions and for different ecosystem components. Managers will rarely be in a position to use formal rule-based management frameworks and even the best laid plan will need to be altered in order to deal with improvements in data and information, changing social and economic conditions, evolving threats or feedback from monitoring.

The cyclic management planning approach facilitates adaptive management. The key rationale for adaptive management is the recognition that our knowledge of ecological, economic, and social relationships is incomplete and, therefore, the management of natural resources is always experimental. Adaptive management therefore aims to improve our management effectiveness by studying the impacts of implemented activities and learning from these. It explicitly states objectives (and hypotheses on how they are to be achieved), monitoring requirements and evaluation methods, and then adjusts and improves actions according to the results obtained and lessons learnt.

The INNOVA Guidelines have been organized as a hierarchical hypertext.

The bulk of content is organised in three Areas (relating to the main aspects in the Protected Area management cycle: planning, implementation and monitoring and evaluation). Content has been organised into Areas, rather than presenting a real table, to stress once more how flexible the use of information shall prove to be throughout the different forms the "manual" may take.

The content Area "**Preparing a Management Plan**" describes the management planning process, from the pre-planning phase to the production and approval of a final management plan.

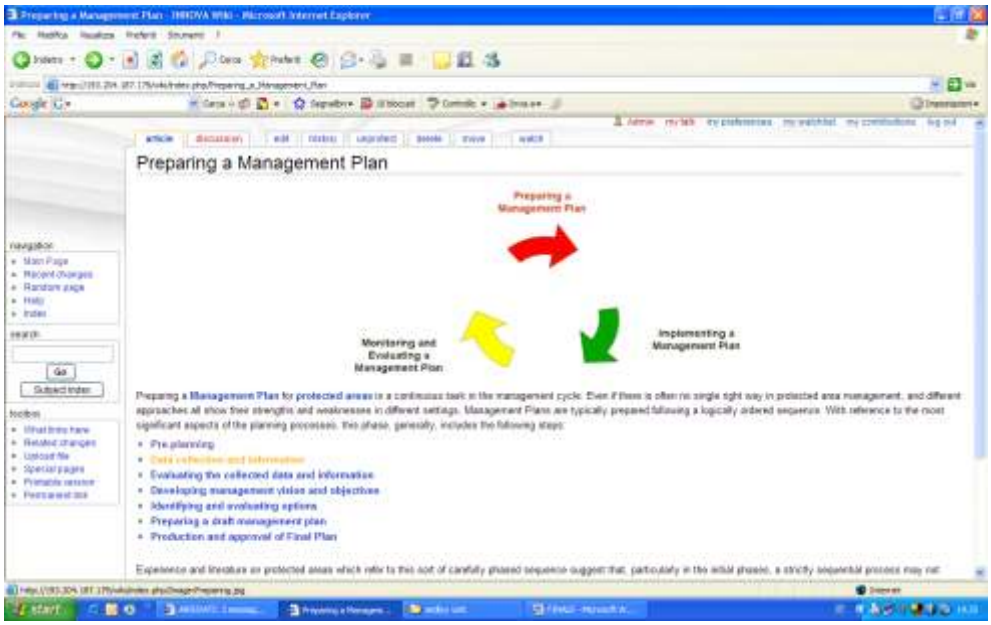

Fig. 2. The content Area “Preparing a Management Plan”
http://151.11.24.150/wiki/index.php/Preparing_a_Management_Plan

The content Area “***Implementing a Management Plan”*** describes the step of the management cycle in which the planned actions are transformed into concrete projects to achieve the management objectives.

The content Area “***Monitoring and evaluating Management Plan”*** provides the necessary background and rational to protected area sustainability evaluation and monitoring as well as the procedure and tools (PASEMP) to undertake such a process at a site level.

Each of the three **Areas** will include **Fields**, which in turn are made up of **Nodes**. The nodes (“articles” in the screenshot) can be considered the basic units of content. Nodes are displayed as a webpage in hypertext, whereas in a printed version they are paged up as a section.

Each Node contains a link to “**open content boxes**” with different kinds of content (**Short guidelines** in the form of “golden rules”, **Good practices** in a form of case study and or link, **Guiding questions** and review of answers frequently asked questions, plus a box for **Further reading**).

Fig. 3. “Open content boxes” related to the “Gathering available background information” node.
http://151.11.24.150/wiki/index.php/Gathering_available_background_information_-_open_content_box

Nodes are supported by a series of **Tools** and **Sources** which will provide more specialized and in depth material to meet particular needs of users.

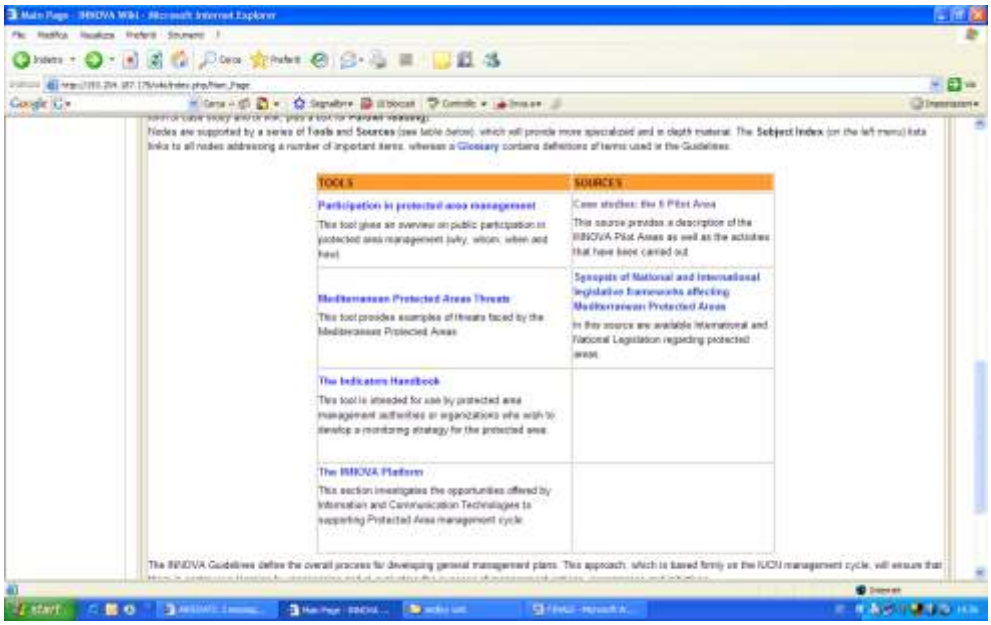

Fig. 4. Tools and Sources accessible from the Main Page of the Guidelines
http://151.11.24.150/wiki/index.php/Main_Page

The tool "**Participation in protected area management**" gives an overview on participation on protected area management (why, whom, when and how).

The tool "**Mediterranean Protected Areas Threats**" provide examples of threats faced by Mediterranean Protected Areas.

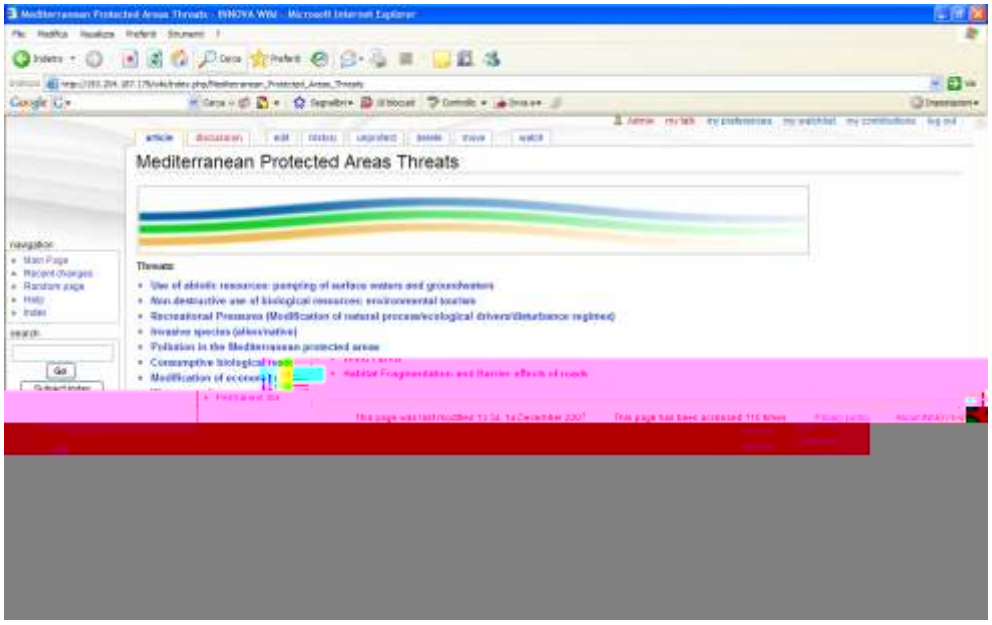

Fig. 5. "Mediterranean Protected Areas Threats" tool
http://151.11.24.150/wiki/index.php/Mediterranean_Protected_Areas_Threats

The tool "**The Indicators Handbook**" is intended for use by PA management authorities or organizations who wish to develop a monitoring strategy for the PA. It is proposed as a flexible tool, or a reference text which should be used in combination with PASEMP guidelines to identify indicators, but also advice on how to implement and report monitoring strategy results.

The tool “**The INNOVA Platform**” explains how the platform works, and how to get the most out of it.

The Source “**Case studies: the 7 Pilot Area**” provides a description of the INNOVA Pilot Areas as well as the activities that have been carried out.

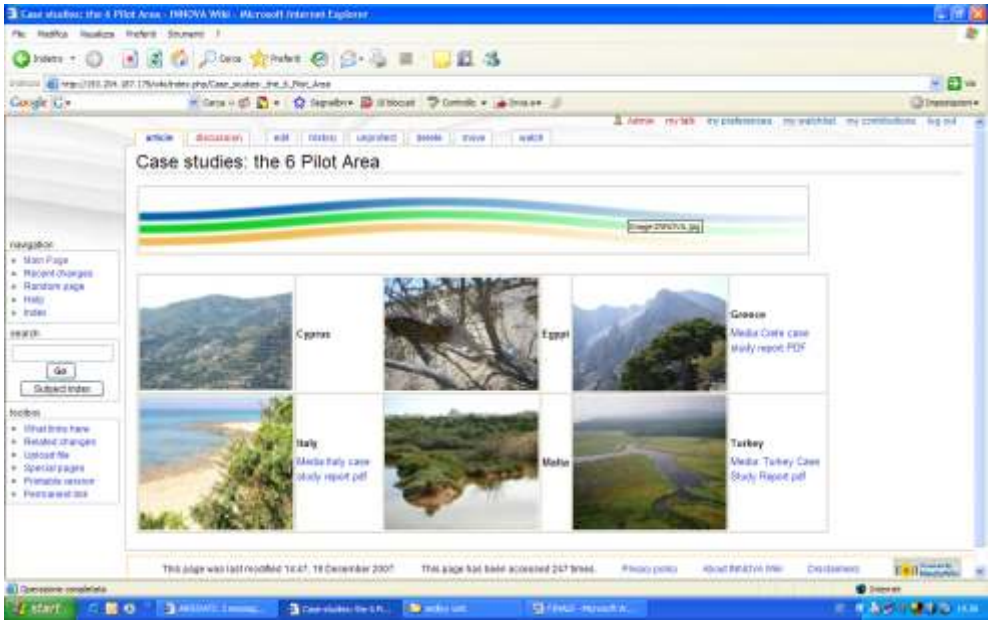

Fig. 6. Source “Case studies: the 7 Pilot Area”
http://151.11.24.150/wiki/index.php/Case_studies:_the_6_Pilot_Area

In the Source “**Synopsis of National and International legislative frameworks affecting Mediterranean Protected Areas**” are available International and National Legislation regarding protected areas.

The **Glossary** contains definitions of terms used in the Guidelines.

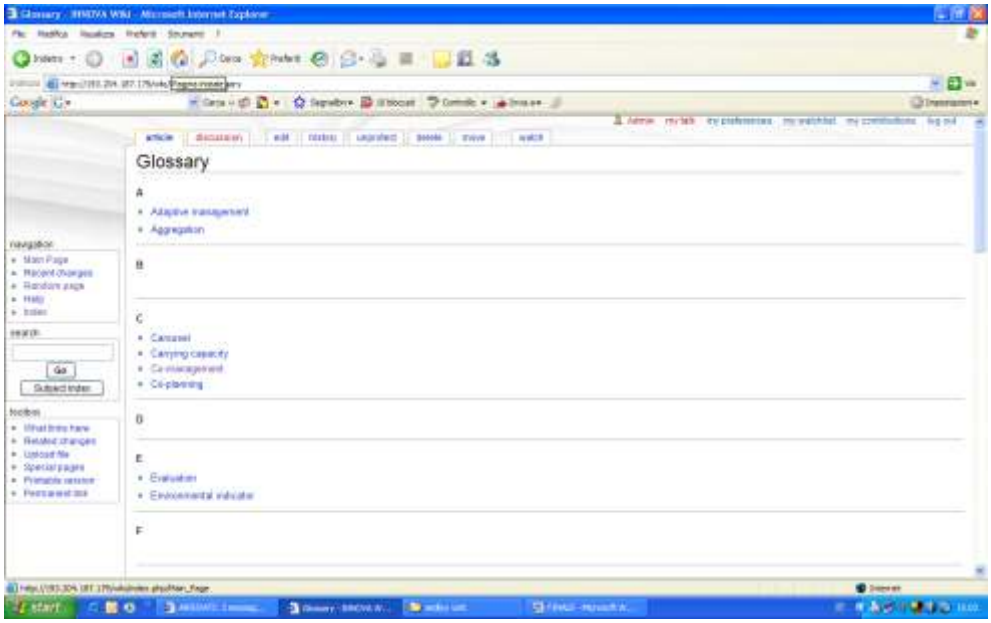

Fig. 7. The glossary of the Guidelines
http://151.11.24.150/wiki/index.php/Glossary

The **Subject Index** lists all terms considered important to build hypertext links. Each term is followed by a complete list of links to all nodes where it is found, so that users will be able to browse easily across areas, fields and nodes, while following their interest for a specific subject.

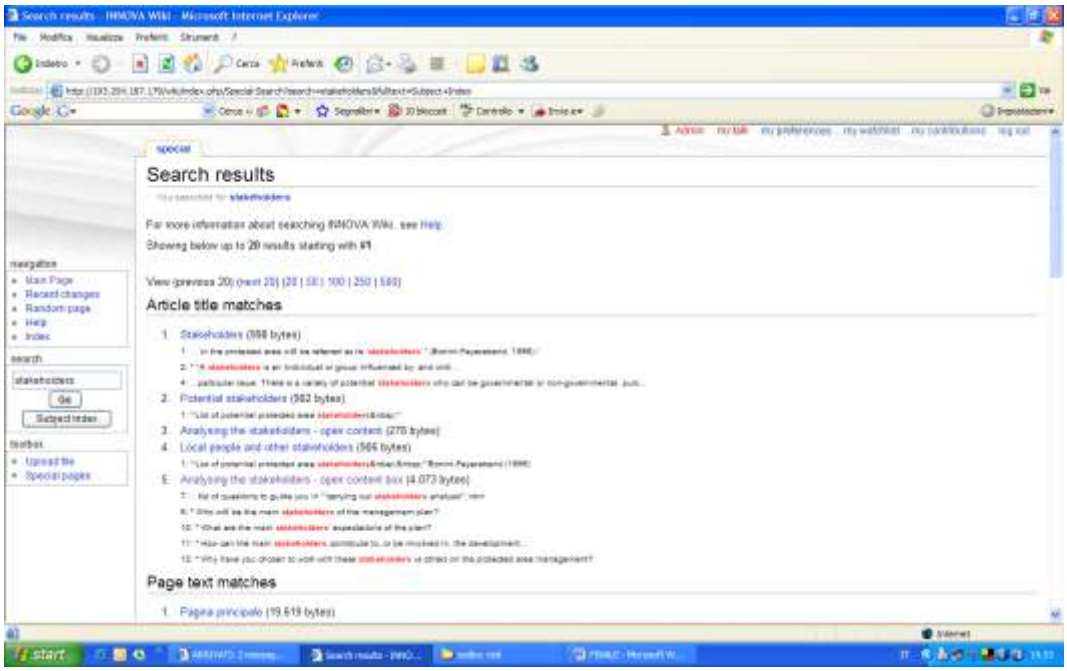

Fig. 8. The Subject Index of the Guidelines
http://151.11.24.150/wiki/index.php/Special:Search?search=participation&go=Go

HOW TO USE AND CONTRIBUTE TO INNOVA GUIDELINES

Users may access any node of INNOVA Guidelines by:
- clicking on the correspondent content Area (Preparing a Management Plan, Implementing a Management Plan; Monitoring and Evaluating a Management Plan);
- entering a corresponding term in the search window.

"**Go**" will direct to a node (article) with this title (if such an article exists)

"**Subject Index"** will provide a list of nodes (articles) where your search term appears.

Practitioners, policymakers and scientists are invited to contribute to INNOVA Guidelines by sharing knowledge and experience in protected areas management.

Users may contribute in several ways:
- improving or updating an existing node
- adding a discussion page to an existing node or adding a new one.

Users have unrestricted access to the INNOVA Guidelines. Authorisation, however, is required for adding or editing contents. To obtain authorisation users may contact the platform manager (contento@iamb.it) or you may simply send an email. The new contribution will be reviewed by the coordinator of the theme where the article best fits.

The INNOVA Partners and the INNOVA Pilot Areas managers may contribute directly to the Open Content Pages (Short Guidelines, Guiding Questions, Good Practices and Further Reading) using their own password, whilst to contribute to the Content Pages they should contact the Platform Administrator, who will provide a new password. The new contribution will be reviewed by the coordinator of the theme where the article fits better.

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INDICATORS TO MONITOR PROTECTED AREA SUSTAINABILITY: THE INNOVA INDICATOR HANDBOOK

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INTRODUCTION

The Mediterranean is an important eco-region, however, it suffers from the lack of common procedures for the management and monitoring of its protected areas sustainability. INNOVA addresses this issue, by developing a procedure namely the PASEMP (See PASEMP Guidelines) as well as tools which can assist Protected Areas Managers and responsible authorities to develop and implement a monitoring strategy for their areas.

One of these tools developed consisted of the INNOVA Indicator handbook which is intended for use by PA management authorities or organizations who wish to develop a monitoring strategy for the PA. The handbook is proposed as a flexible tool, or a reference text which should be used in combination with the PASEMP guidelines to identify indicators, but also contains guidance on how to implement and report the monitoring strategy results. The handbook should be used in conjunction with the INNOVA platform which provides the opportunity to identify relevant indicators automatically. However, this handbook can also serve as a reference text regarding background information on indicators and the preparation, implementation and reporting of monitoring strategies.

The work carried out to develop this Indicator handbook comprised the following:

- Literature review on indicators of sustainable development
- Review of existing indicator databases with the aim of compiling a list of relevant links for users to identify indicators
- Development of INNOVA indicator database:
  - Development of indicator medatafiles (forms to be filled in describing individual indicators)
  - Identification classification and inclusion of relevant Mediterranean PA indicators into indicator database.
  - Application of PASEM procedure for the generation of Pilot PA specific indicators and their classification and entry into the indicator database
- Compiling of indicator handbook.

INDICATOR FUNDAMENTALS

Definitions and use

The use of indicators at the national, regional, local and field level has become a common assessment tool (Donnely *et al*, 2006). Indicators have a number of uses one of which is that they quantify and simplify information in a manner that facilitates understanding of environmental problems by both decision makers and the public. Their goal is to assess how project activities affect the direction of change in environmental performance, and to measure the magnitude of that change. Indicators that allow evaluation of project impacts are particularly useful, since they provide more information than just whether the project is improving or degrading the state of the environment. Information on the magnitude of a benefit is required to determine whether it is worth the resources being expended to achieve it. Similarly, information on the magnitude of adverse impacts might indicate whether the harm is justified given the other benefits of the activities in question. Above all, an indicator must be practical and realistic, given the many constraints facing those who implement and monitor projects (Segnestam, 1999).

What makes a good indicator?

The number of indicators that can be invented and constructed for measuring and benchmarking sustainability is in principle boundless. In contrast, the capacities and resources of any PA manager or other user of indicators to collect data, calculate indicators and interpret the results are usually very limited. For this reason the evaluation and selection of indicators is helpful to highlight very valuable indicators and sort out the less valuable ones (from the perspective of measuring and benchmarking PA sustainability).

The literature is characterized by numerous indicator frameworks (see Innes & Booher, 2000 for a review), which are aimed at structuring indicator selection, some are objectives based, others problem based at different scales etc. Based on an extensive review of the literature, INNOVA has developed the PASEM procedure which essentially enables the selection of indicators to monitor the Sustainability of PAs. The PASEMP and its principles will not be reiterated here (See PASEMP guidelines) however, there are some fundamental criteria for judging assessment procedures and subsequently monitoring strategies, which should be taken into account by users of this handbook. These are the Bellagio Principles developed in 1996 (IISD, 1997).

These principles deal with four aspects of assessing progress towards sustainable development. Principle 1 deals with the starting point of any assessment - establishing a vision of sustainable development and clear goals that provide a practical definition of that vision in terms that they are meaningful for the decision making unit in question. Principles 2 through to 5 deal with the content of any assessment and the need to merge a sense of the overall system with a practical focus on current priority issues. Principles 6 through 8 deal with key issues of the process of assessment while principles 9 and 10 deal with the necessity for establishing a continuing capacity for assessment (IISD, 1997).

The ideal sustainability indicator

There is extensive dispute in the literature over the ideal methodological characteristics of indicators (Hardi and DeSouza-Huletey, 2000; Shane and Graedel, 2000; Custance and Hillier, 1998) which are also relevant to the Bellagio Principles which the PASEMP aspires to meet. The main methodological disputes concern:

- the appropriate number of indicators;
- the most suitable way of presenting them; and
- their nature (i.e. qualitative vs quantitative).

For the purposes of this handbook, it is not possible or theoretically appropriate to predetermine and specify the number of indicators which should be used. Instead the number of indicators should be agreed upon by the evaluation users (Ukaga and Maser, 2004) having taken into account the scale and nature of protected area they are evaluating as well as the relevant feasibility issues, such as cost and availability of data.

Apart from the Bellagio Principles there is a great deal of literature reflecting on the ideal nature (characteristics) of sustainability indicators. There are disputes as to whether indicators should be quantitative or qualitative (Pinfield, 1996). Guy and Kilbert (1998) and Mitchell (1996) do not explicitly exclude the use of qualitative indicators but make the assumption that they should be quantitative. There is also disagreement on the desirable extent of aggregation or integration of indicators (Morse *et al,* 2001; AtKisson and Hatcher, 2001; Neumayer, 1999; Meadows, 1998; Mitchell, 1996). Aggregation refers to: "*combining a wide range of similar measures into a number with a common denominator like Gross Domestic Product (GDP), or combining measures of different kinds into an index (like the Human Development Index)*" (AtKisson and Hatcher, 2001, p. 512).

The appeal of this approach is evident with the wide adoption and use of GDP, and similar indices which are recommended for their ability to easily compare scenarios and situations (Therivel and Levett, 2004). However there is much criticism of this approach (Clifford *et al*, 1994; Morse *et al*, 2001). Increased aggregation requires the translation of qualitative subjective parameters into values, for example placing a monetary value on biodiversity which can be misleading, providing a sense of certainty and objectivity which does not necessarily exist (Eiswerth and Haney, 2001). Monetarisation also implies that everything can be given an economic value which according to Dahl (1997) is not possible. Increased aggregation also does not allow evaluation users to identify where the problem exists in order to take action, and thus is unsuitable for site level PA evaluation which should provide the evidence base for mitigation and improvement (George, 1999).

The presentation of indicator results is another issue needing clarification. Cartwright (2000) amongst others points out the need for simplicity in presentation when considering the importance of indicators as educational tools. Thus, Bell and Morse's (2003 pg 43) comment: "*on the need to integrate information in a way which can lead to action, thus not disguising through visual integration the areas which need addressing"*, is relevant, and the approach recommended for the selection of PA sustainability indicators.

However, when developing sustainability indicators and presenting their outputs, there is also the need to develop reference conditions to gauge progress (Bossel, 1999). This is inherently difficult and even more so for the case of PA. Common techniques use historic references whereby the sustainability of the system's condition is compared to those in the past which are assumed to be more sustainable. In the case of PA this is not always due to potential lack of historical data. There is inherent subjectivity in setting reference conditions for sustainability indicators and the issues of scale of relevant data and benchmarks complicate matters further (Bell and Morse, 2003; Therivel, 2004). Ukaga and Maser's (2004) and Bell and Morse's (2003) approach is therefore adopted, who propose the use of a locally relevant and participatory approach for the establishment of reference conditions and benchmarks.

The above shows there is no consensus regarding the nature of an ideal indicator and that indicator selection is a subjective process. Different indicators will be appropriate in different evaluation processes and circumstances. Although a general approach has been proposed for the case of PA sustainability evaluation it is also considered appropriate that indicator characteristics and evaluation criteria used for selection should be agreed through a deliberative approach by stakeholders in the PA (Todd and Geissler, 1999; Ukaga and Maser, 2004 and Bell and Morse, 2003). Monetarised and highly aggregated numeric and visualization approaches are considered inappropriate, and an action and decision making focus as well as a locally relevant benchmark approach based on participatory methods is proposed.

PREPARING A MONITORING STRATEGY USING THE INNOVA PLATFORM

According to the INNOVA principles a PA sustainability monitoring strategy should be designed to be holistic, context specific, participatory, as well as practically applicable and relevant to PA management and governance procedures. The PASEM procedure has been designed with these specifications in mind in order to generate indicators which are relevant to the values of the PA, address its threats as well as monitor the achievement of it sustainability objectives (See PASEMP guidelines). The PASEMP has been designed in a way that it can be carried out as a paper based exercise, but also has the option of using the INNOVA platform and indicator database to generate an initial list of indicators. In this section the PASEMP will not be re-iterated but only the function which can be conducted through the platform described.

Selecting the monitoring strategy indicators

The INNOVA Platform amongst other things incorporates a database with indicators obtained from various sources and existing international databases many of which have been selected and trialed through the Pilot Case studies. Each indicator before being inputted into the database has been characterized using a specially designed metadata form. This characterization is inextricably linked to the stakeholder rapid appraisal questions which enables the automated selection of PA specific indicators. This means that once stakeholder questionnaires have been completed, the platform calculates which are the most important values, threats and objectives of the specific PA, and identifies which indicators have been characterized as relevant to those, presenting them in a form of a draft list of proposed indicators. The platform is an open system, allows its users to add relevant indicators and fill in their metadata files when necessary. This results in a continually updated and growing indicator database.

Essentially, an indispensable functionality of INNOVA Platform is the selection of appropriate indicators from a larger set of indicators embedded in the software's core. The procedure of indicator selection begins with entering the Rapid Appraisal Questionnaire answers. Meaning that the Rapid Appraisal Questionnaire is available on line- through the platform- so stakeholders can complete the questionnaire remotely. Alternatively, the PA manager or person carrying out Step 1 of the PASEMP can conduct paper based interviews and then transfer the results / responses of each stakeholder on to the web based forms.

As mentioned previously, specific questions will be averaged and scored for the same site. This will lead to the selection of a draft list of indicators for monitoring of the specific site. This procedure is done using separate indicator metadata files for each indicator and a set of rules that link them with the Rapid Appraisal Questionnaire answers. These metadata can generally be thought of as information that describe, or supplement, the central data.

Writing the monitoring plan

Having gone through the PASEM procedure and selected the relevant sustainability indicators the monitoring strategy should be written up in the form of a monitoring plan. The monitoring plan should be a fairly concise document (as it is to be used as a working document) that should summarize the why, what, where, when and how of the PA monitoring strategy. Below an indicative structure of a monitoring plan and the items it should cover is presented.

Monitoring Plan Outline- proposed structure and content:

A. Introduction and Background
- Brief description of the PA and relevant policy and legislation
- Explain who the purpose of the monitoring strategy- who should use it
- Describe the PASEM procedure followed (i.e. who was involved and what are the main values, threats and sustainability objectives which guide the monitoring strategy).

B. Indicators to be monitored

List agreed indicators monitored.

C. Sampling Design
- Describe the overall statistical sampling design that allows inferences to be made to areas larger than those actually sampled. Detailed maps and descriptions of where samples will be taken can be included in the protocols or an appendix, but summarize the overall spatial design for the PA.
- The sampling design should be specified for each indicator, but an overall sampling strategy needs to be collated.
  Where available benchmark/ reference values for indicators should be indicated. If these do not exist a baseline study should be carried out to set thresholds which should also be described.

D. Sampling Protocols
- For those indicators that are currently being monitored or for those which are proposed a monitoring protocol should be developed, give an overview of each sampling protocol that will be used to monitor the indicators.
- At a minimum, this section should include a table that summarizes key information from the protocols. Key information should include the name of the protocol, a brief justification statement, the specific measurable objectives of the protocol, and location of implementation.
- List the specific, measurable indicators and data selected for monitoring, and wherever possible, give the threshold value or “trigger point” at which some action will be taken.
- For each protocol, identify the target population or “sampling frame” and the sampling units.

E. Data Management
- Provide an overview of the process for entering, editing, storing, and archiving data collected by the various components of the monitoring strategy, including metadata procedures.

F. Data Analysis and Reporting
- Summarize information from the sampling protocols that describe the procedures for ensuring that data collected by the monitoring strategy will be analyzed, including who is responsible and how often analysis will occur.
- Reports are intended for a variety of audiences. Describe the various reports, websites, and other products of the monitoring effort, including what they will include, who the intended audience is, how often they will be produced and in what format, and who will be responsible for ensuring that data are analyzed and reported in a timely manner.

G. Administration information on monitoring strategy implementation

- Describe the makeup of the people and bodies involved in the monitoring and their role in developing the monitoring strategy and implementing and promoting accountability for the monitoring program.
- What is the staffing plan for the monitoring program? Who will be involved in the program, where will they be stationed, and what is their role in the program?
- Integration with other PA procedures: describe how the monitoring strategy integrates with other PA operations such as interpretation, law enforcement, and maintenance.
- Partnerships: Describe other agencies and individuals that are part of the monitoring strategy. List cooperative agreements and other partnership agreements that are in place.
- For field sampling efforts to be performed in house, describe how they will be supported in terms of staff training and/or previous experience, field equipment to be dedicated to the effort (vehicles, instruments), anticipated in-house lab work to support operation, maintenance, and calibration of equipment and its documentation, and the necessary safety considerations in performing field tasks.
- Periodic Reviews: explain the process and schedule for periodic reviews of the overall program and various components and protocols.

H. Schedule

- Summarize the frequency of sampling for the various components of the monitoring strategy (e.g., during what season of the year, and whether sampling should occur annually or once every several years).

I. Budget

- Provide an overall budget that summarizes the annual and periodic costs of the monitoring program. At a minimum, provide a one-year budget for the first year after the monitoring plan is expected to be approved and implemented. Use the budget categories from the annual administrative report budget program (e.g., income, personnel, cooperative agreements, operations/Equipment, etc).

J. References

Provide references for standards or procedures used.

K. Appendices

Include supporting documentation such as workshop reports, sampling protocols, the data management plan, and other documents that are referenced by the main monitoring strategy.

IMPLEMENTING THE MONITORING STRATEGY

Monitoring strategy implementation essentially consists of carrying out what is specified in the monitoring plan (See Section 3) according to the budget and schedule specified. The two core elements of the monitoring strategy implementation can be classified as a) the data collection and all the related components such as sampling design, protocols and data management as well as b) the data analysis. A brief theoretical description of key issues in data collection and analysis of sustainability indicators is provided below.

Data collection

Data collection methods are inherently dependant on the point of study as well as the indicator itself. However, there are some key issues and difficulties regarding indicator data collection which are described bellow. What this section doesn't do is present or analyze the different methods of data collection. For this reference to data collection methodology books is encouraged.

Data sources - relevance and availability

There are many different types of sources of data, primary and secondary which do not require data collection. One may carry out the following:

a) list specific pieces of data needed
b) identify both primary and secondary sources for each piece of data in order to produce a comprehensive list of all potential sources.

c) Consider the reliability, validity, feasibility, benefits, costs and other relevant factors associated with each source of a needed piece of data.
d) Select the best source for getting the data needed to inform the indicator.

There is also the need to determine the population and sample size, meaning develop the sampling design. The procedure whereby representativeness items from a population are selected in order to study and understand their characteristics, and then generalize back to the total population, is called sampling design. This is necessary in order to justify conclusions drawn statistically as well as increase their robustness. Additionally there is the need to specify the frequency and periods of data collection. The appropriate sampling design and frequency is indicator and site specific, and reference to standard research methods and sampling protocols should be made.

However for some issues there is a lack of data, particularly long term trends. In this case proxy measures may need to be used; for example, we may have long term trends of chemical concentrations in rivers but few data on the ecological effects of such pollutants. For other issues there may be a problem of representativeness and of scale. For example there may be information on a national scale but which is not relevant to the PA understudy. Often historical data are lacking for many indicators and are disrupted by changes in political boundaries and in sampling sites and methods. Information can be incompatible with the PA or study boundaries. Finally, data may not meet statistical confidence limits.

Setting targets/reference conditions

Assuming that the indicators have been defined, the question still remains regarding: what is the goal? Just what are we aiming for? Bell and Morse (2003) define to broad approaches:
a) A defined target for an indicator/ index. The aim is to get some/ all of the indicators to this target.
b) A defined direction for an indicator/ index. The aim is to get some/ all of the indicators to move in the desired direction.

The notion of a defined target or threshold is equal to a sort of best practice for indicators of sustainable development. It allows decision makers to judge the gap or distance between what is and what should be (Gilbert, 1996). It is also a familiar approach in a number of fields where indicators have been applied. IN environmental management for example there are level targets for levels of pollutant emission and critical concentrations in air and water. Each indicator would have its own threshold, but knowing what these are is not by any means an exact science. Even with the more bio-physically based environmental indicators (Syers *et al,* 1995) there is much subjectivity.

The reference value should be a single value for an indicator of index although perhaps backed by legislation, or it could be a desirable range (a band) (See Bell and Morse, 2003). However, the setting of a reference condition for sustainability indicators is not an easy process as in many cases reference targets do not exist (Custance and Hillier, 1998).

Some have used a historical state of a system as a reference condition; however, often a reference year is selected on the basis that it is a convenient baseline upon which to plot the future rather than it being a reference of sustainability. An alternative to the use of a reference year is to compare the system to one currently in existence and assumed to be sustainable (de Soyza *et al*, 1997). One could also try and reconstruct what the reference condition should be from principles rather than from anything that has been seen (a theoretical reference condition) (Bell & Morse, 2003). Historical, geographical and theoretical reference systems are attempts to base decisions on some notion of quasi-objective condition rationalized to represent sustainability. A different approach can be adopted which involved asking stakeholder what they think the reference condition should be (i.e. the worst and best cases for each indicator, providing a stakeholder reference system. Naturally there may be much inherent subjectivity and value judgment is such stakeholder based reference systems and opinions may be diverse. Thus the combination of these approaches on a needs basis is recommended.

Having established a reference condition, there is a need to calculate the deviations of indicators from this reference condition, taking into account the polarity of sustainable development in each case. Baring in mind that there are some indicators for which it is unclear which direction would be more sustainable. Examples include certain background indicators, like underlying demographic change, or change in the structure of the economy, which provide important contextual information and indicators of the price of resources (Custance and Hillier, 1998).

Aggregation and integration

Indicator integration is basically a means by which individual and quite different indicators in a framework can somehow be viewed together to provide an holistic view of sustainable development (Bell & Morse, 2003). It attempts to get around two problems often attributed to indicators (OECD, 1998):

a) Complexity. Many indicators may be sensible from a technical perspective, but one can loose sight of the bigger picture and become enmeshed in detail.
b) Compromise. An indicator framework may not allow an immediately apparent analysis of trade offs between some indicators and others.

Attempts to deal with the above two problems have resulted in the following approaches. Aggregation to a single index- which is useful for presenting information to the public, but limits interpretation capacity. Aggregation could be either visual (using tables or diagrams) or numerical for example monetary aggregation.

There are many different approaches, which all have limitations, increased aggregation can lead to loss of transparency and the capacity to determine cause and affect relationships, where as disaggregated approaches can result in lack of understanding and communication of messages. A one fits all solution does not exist and the approach adopted should be PA specific taking into account skills and know how of end users.

Determining less readily quantified uses

Some issues are important but they are not readily quantified. These include for example measures of aesthetic qualities of landscapes and buildings, the amenity value of the countryside, the effects of tourism, changing patterns of land use etc. Not including such issues on the basis that they are not readily measurable, would result in significant gaps. The issues of non quantifiable measures are more common for social issues. However, qualitative techniques of data collection are available and should be used as and when necessary. Indicative methods of qualitative data collection methods include: focus group, nominal group process, community meetings, surveys, creative expressions, diaries/journals/ logs, interviewing, investigative inquiry, mapping, observation, pilot projects, photographs, workshops, records field notes, unobtrusive methods etc.

Data analysis

Data collection consists of collecting the data required to inform the indicator. The data itself is not an indicator, and neither necessarily meaningful for decision makers (Fig. 1). Thus there is the need for appropriate analysis of the data to produce information using the indicator.

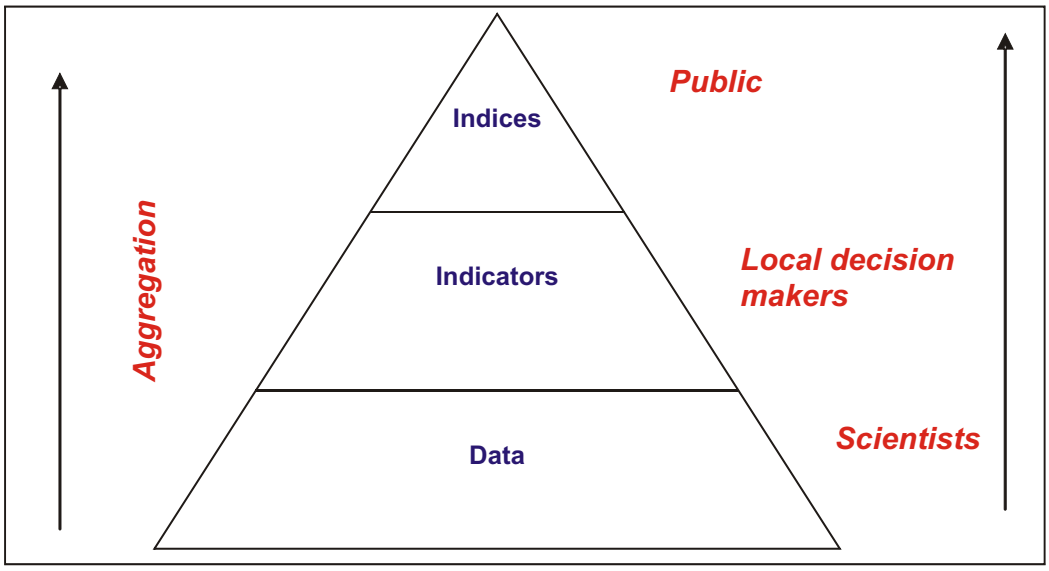

Fig. 1. Relationships between indicators, data and information adapted from the OECD “pyramid of indicator sets”

The first step in analyzing the data is to thoroughly examine the data and unequivocally determine that they are accurate, logical and suitable. The examination needs to identify whether there are any problems that would lead to questions concerning the quality, integrity, or appropriateness of the data. Signs of problems include data that do not reflect the expected sample size, number of variables, specific variables of interest given a geographic area, etc.

Methods of data analysis depend on the data itself and the sample size. It is not within the scope of this handbook to describe data analysis methods. However, the aim of any analysis, qualitative or quantitative is to obtain meaning out of the data. Statistics can be used both for qualitative and quantitative data following initial coding and processing. Again the appropriate statistical analysis required will depend on the data itself.

Nevertheless, it is important that data analysis issues are considered prior to data collection, to avoid the often common mistake of collecting data which then cannot be meaningfully analyzed.

COMMUNICATING AND REPORTING THE MONITORING RESULTS

Unless people are informed about the results of the monitoring strategy, how can those who need to make decision and act on the findings know what the conclusions are? To be well utilized the results of the monitoring must be appropriately communicated to the people who need to understand the findings. Assuring access to and dissemination of monitoring findings is therefore imperative.

A monitoring strategy like the PASEMP which is participatory in nature has a head start in this regard because everyone involved should be familiar with and interested in the monitoring findings. Nevertheless, the results must be communicated intentionally, explicitly and strategically to the participants, as well as to other stakeholders, because it usually takes more than those directly involved in a given monitoring strategy to fully and effectively use its conclusion.

Best practice literature (Ukaga and Maser, 2004) underline the importance of developing and implementing a communication strategy for the dissemination and use of monitoring strategy results. An essential component of a communication strategy is the identification of target audiences which includes determining who needs to know what, why, when and how. So the first task is to determine the target audience and then to record the important characteristics of each audience. Depending on what is being communicated and how, it may be important to know such things as the kind of information required, socio economic status, experience age gender, interest philosophy, religion, educational background, occupation, political orientation of the audience and their knowledge of and their attitude toward the subject and the messenger.

The idea is to learn what is relevant and therefore necessary in order to communicate the message appropriately and effectively. Clearly compatibility of the message with the receivers need for the information is an important factor. For example, the PA management authority may need to know exact species cover and population size, where as the public or decision makers probably only need to know what species are present and whether they are under threat.

Custance and Hillier (1998) point out the need when presenting monitoring results to make explicit the uncertainty of any results. For example, reliability of estimates is highly dependant on what is being sampled, the sampling methods and resources employed, and how the results have been aggregated. Thus it is proposed that an indication of the uncertainties of results should be reported and well documented for any indicator.

Additionally, there is an issue of inconsistency in the literature regarding definitions and classifications. It is thus proposed that definition of indicators as well as a description of the data collection and analysis methods is made explicit. This will also enable future replication and follow up of monitoring. The use of monitoring protocols is considered a useful aid to overcome the above issue.

In conclusion, the need to document the full result of the monitoring strategy on a regular transport report is considered necessary, regardless if the public should also be informed using different methods. Below a proposed structure of such a report is presented.

Indicative monitoring strategy result report structure

Below an indicative report structure is presented which PA managers can use to present the results of their monitoring strategy:

A. Introduction
- A.1. PA background and objectives of monitoring
- A.2. Identification of the report users and relevance to decision making
- A.3. Institutional, organizational and resource arrangements for indicator development

B. Identification and Selection of indicators (description of the implementation of PASEMP in specific PA
- B.1. Identified PA indicators, sustainability objectives, threats, and values
- B.2. National strategies, targets and priorities
- B.3. Existing indicators and monitoring programmes
- B.4. Data availability
- B.5. Indicator reference conditions and their method of determination

C. Indicator results
- C.1. Methodology of data collection and analysis
- C.2. Results obtained
- C.3. Analysis of findings against reference conditions
- C.4. Description of uncertainty and difficulties encountered regarding:
  - a) data availability reliability and delivery
  - b) strengthening and training of human resources
  - c) other capacity building needs

D. Recommendations regarding actions required based on indicator findings for PA.

CONCLUSIONS

In this paper and the INNOVA Indicator Handbook developed by MAICh the fundamentals regarding indicator and monitoring strategy, development, implementation and dissemination have been presented. It is intended for use by PA managers and decision makers and envisaged to stimulate and support further work, testing and development of indicators, particularly for use in PA. It is concluded that no set of indicators can be final and definitive, but must be developed and adjusted over time to fit PA and country-specific conditions, priorities and capabilities. It is our hope that protected areas throughout the Mediterranean will take advantage of the useful information as well as the INNOVA platform to further advance the work on indicators by adding their own unique perspectives to what already has been learned. We look forward to including your experience and indicators in our database.

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INNOVA PROTECTED AREA "MANAGEMENT PRACTICES DATABASE"

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THE INNOVA APPROACH TO MANAGEMENT PRACTICES

Sharing management practices[1] plays a key role in the mutual learning process among INNOVA project partners, as well as within a broader arena of PA managers and stakeholders. Placing "good practice" at the core of cooperation has become an undisputed feature at both international and national levels, as witnessed by the initiatives listed in **section 5**.

Notwithstanding such a wealth of existing sources of information, the INNOVA project has attempted at offering innovative services to improve the availability of relevant knowledge in the specific field of Mediterranean protected area management.

We have chosen to accept both *good* and *bad* practices following the assumption that they can be equally informative, since learning how to avoid certain pitfalls can be as useful as trying to replicate successful stories. The INNOVA database aimed at collecting and schematizing those practices whose analysis could contribute to managing Mediterranean protected areas in general, and the INNOVA Pilot ones, in particular. In fact INNOVA contribution went along two parallel directions:

1) facilitating users' access to relevant information in existing databases, **to broaden the general knowledge base**;
2) dwelling more in depth on very specific management practices, planned or carried out exclusively in INNOVA sites, **to maximise mutual learning among project participants**.

As for the first track, besides providing links to other known and trusted databases, we thought of a **metasearch engine** to enable the easy identification of interesting cases from as many sources as possible.

INNOVA users would then be able to enter any such case in our database, by labelling it a ***relevant practice***, given it meets the following requirements:

1) it should actually be a "practice", that is, **a way of accomplishing a given task, an intervention, plan, policy, or programme dealing with the management of protected areas** that is being planned, in progress, or already carried out;
2) it should be **reasonably transferable to other socio-environmental settings**, and more specifically to those typical of the Mediterranean Area;
3) it should be **consistent with general objectives of nature conservation, environmental quality and sustainable development** as defined by international legal instruments and scientific literature;
4) it should be possible to link it to one or more domains among those used in the framework of the **INNOVA project to model the sustainable management of protected areas** (e.g., the four pillars of sustainability, including governance, or any items that have been grouped under the categories "Protected Area Values", or "Protected Area Threats").

The idea behind a *metasearch engine* is to create a common query form that would allow information retrieval from different databases. The effectiveness of such a tool relies heavily on the standardization of databases to be searched, as in the case of Libraries' On-line Public Access Catalogues (OPACs), where indeed metasearching now represents a common feature. An example in a more related field can be found in the **Costal Portal**, developed under the EU-funded ENCORA project[2].

[1] For the sake of synthesis, we use throughout this document the definition "management practices", but it is understood that we are actually including all kinds of activities concerning protected areas (planning, evaluation, monitoring, *etc.*).
[2] Browse at http://www.encora.eu/index.php?option=com_websearch&Itemid=73

Moving to the second direction we want to explore, the basic assumption is that only those practices that have been tested by participants in the INNOVA project (even if just at the level of planning) should become part of the common toolbox we are trying to develop. We would label them ***INNOVA practices***, as they would have been experienced and validated by at least one partner, and we would attach more importance to them because of the chances all other partners would stand to learn by interacting directly with the proponent. In this perspective, ***relevant practices*** would be important as project participants could draw inspiration from a wider array of cases when deciding, and eventually implementing, new courses of action.

The third and last typology we included in the database has been named ***argumented INNOVA practices***. The term "Argumentation" has come to epitomize a fast developing field of research and practice, stemming originally form *computer science* and *cognitive studies*, but then leaking to several domains, including *environmental studies* (Jiménez-Aleixandre, 2002) and *spatial planning* (Carver and Rinner, 2001). This status occurs when a practice tested by one project participant is **annotated with an explanatory construct** to help readers understand *what really worked about the practice*, that is, what *outcome* can be related to the interaction of certain *mechanisms* with key *context* features. The *Context-Mechanism-Outcome* framework we have been inspired from was introduced in the field of programme evaluation by Pawson and Tilley (1997).

THREE TYPOLOGIES OF PRACTICES AND THE FORM TEMPLATE

In the previous section we have introduced the following categories of practices:

1) **relevant practices** could reasonably "work" in Mediterranean protected areas;
2) **INNOVA practices** have actually been applied in one or more INNOVA Pilot areas;
3) **argumented INNOVA practices,** after having been tested in one or more INNOVA Pilot areas, have been thoroughly analyzed by proponents, who also tried to explain them in terms of the aforementioned Context/Mechanism/Outcome framework.

These categories are by no means representative of different objects: the same practice could enter the database as a *relevant* one, when a participant finds it somewhere (say, in one of the databases we mention in **section 5**) and thinks it could be applied in Mediterranean protected areas; then, it could be actually implemented by the same or another project participant, thus becoming an *INNOVA practice*; eventually, it could be explained in depth by those who experienced it through the *Context-Mechanism-Outcome* framework, and from that moment on it would be marked as an *argumented INNOVA practice*.

The only remarkable difference among the three categories will consist in which fields of the form will have to be filled in, as shown in Tables 1 and 2.

The form template consists of four groups of fields. The pink fields contain "basic information". It is always required and regards both general information on the practice (e.g. Practice title, Short description) and helps placing the practice in the INNOVA framework (for example, in terms of *Sustainability domains*, *Ecosystem categories*, *Sectors of intervention*, *Protected Area Threats* and V*alues*, *Objectives*). These attributes enable focussing the search of management practices, and allow an easier connection between the "Management Practices database" and other INNOVA modules.

To enter a **"relevant practice"**, it is enough to provide this basic information by filling in the pink fields, whereas a further effort is required for an **"INNOVA practice"**. We refer to the blue fields, delivering a "Description of the practice and of the Protected Area" with more specific information on the practice (budget, timing, state of implementation, *etc*), and the PA (monitoring system, IUCN category, managing authority, *etc*.).

Yellow fields implement the chosen "logical framework", and they need to be filled in when entering an **"argumented INNOVA practices"**. Describing the practice dynamics in terms of the context/ mechanism/outcome framework and engaging in a periodic review of implementation are thought to grant an added value and an improved effectiveness to sharing practices through the database.

At the bottom of the form, white fields are for "additional information". Although they are optional, their completion is desirable as they allow to:

- attach documents for dwelling on the practice in hand;
- create a connection with the *Territorial Information System* module by providing spatial data

concerning the practice;

- make connections with other platform contents (e.g., indicators contained in the *indicators database*, *guidelines*, *etc.*);

Table 1. Practices form template. Pink fields should always be filled in, blue ones are for both types of INNOVA practices, and yellow fields for argumented practices only.

BASIC INFORMATION	
Practice ID	
☐ **Category of practice**	choose one
Title	(free text area)
☐ **Application area**	(free text area)
☐ **Location of Application Area**	(region, country, province)
Short description of the practice	(free text area)
☐ **Sustainability domains**	choose one or more
☐ **Ecosystem categories**	(multiple choice response)
☐ **Sector of intervention**	(multiple choice response)
Source of information	(free text area)
DESCRIPTION OF PROTECTED AREA	
☐ **Name**	**choose one**
☐ **IUCN Category**	choose one
☐ **Other International Designation**	
☐ **National and Local Designations**	
Managing Authority	
Size	(surface area)
Number of staff	(permanent and/or temporary)
☐ **Monitoring system / Indicators**	
DESCRIPTION OF THE PRACTICE	
Scale of intervention	
Activities and outcomes achieved or expected	(free text area)
☐ **State of Implementation**	choose one
Date of start/ Date of end	
Duration (months)	
Funding Organizations	
☐ **Approximate Budget (euro)**	
Implementing Organization	
Partners	
☐ **Protected Area Values addressed by the practice** (according to INNOVA PASEM Procedure)	
☐ **Protected Area Threats addressed by the practice**(according to INNOVA PASEM Procedure)	
Objectives (Key, Overall, Operational)	
Value judgement	choose one
Comments	(free text area)
Contacts	(Name, Address, E- mail, Phone Fax, URL http://....)
LOGICAL FRAMEWORK	
Context	(please, describe the socio-environmental features that might explain the observed outcomes)
Mechanism	(please, describe the dynamics activated by the intervention that might explain the observed outcomes)
Outcomes	(please, describe the observed outcomes that might be explained by the interaction among practice mechanism and protected area context)
Periodic review of implementation	long term outcomes of the practice, *etc.*
ADDITIONAL INFORMATION	
Attached documents	
Link to Territorial Information System	(if maps or data describing the practice are available)
Links to relevant Guidelines sections	

Table 2. A summary of the fields required for each practice category.

	Practice categories		
template fields	**relevant**	**INNOVA**	**argumented INNOVA**
Basic information (Pink fields)	***required***	***required***	***Required***
description of Practice/PA (Blue fields)	*Not required*	***required***	***Required***
Logical framework and monitoring (Yellow fields)	*Not required*	*Not required*	***Required***
Additional information (White fields)	*Optional*	*Optional*	*Optional*

SEARCHING THE DATABASE

Searches will be allowed in most fields; yet key words will be as often as possible standardized by developing an appropriate *taxonomy*. Thus, searching the "management practices database" will be easier, and a better logical connection with other INNOVA modules will also be secured by sharing the same taxonomy. In other words, once a certain terminology has been agreed by project participants (e.g. "sustainability objectives", "threats" and "values" concerning protected areas), it should be extended to other project activities, to minimize confusion.

Back to Table 1, all searchable fields have been marked by a check-box. By selecting one or more boxes, users will choose those fields they want to search in, since searches are allowed for one or more fields simultaneously.

As for *key words*, "multiple choice" fields require users to search for one of the standardized terms, whereas searches in "free text" fields are, of course, possible for any keyword. Anyway, in addition to this "advanced" search system, a simple search, detecting *keywords* in any fields, will always be possible.

Due attention was paid while designing the form template to both "Sectors of intervention" (Table 3) and "Ecosystem categories" (Table 4) fields, to make sure they grasp the main features of protected areas in the Mediterranean context.

Table 3. Sectors of intervention

Sectors of intervention		
1) Agriculture and breeding	12) Housing Police and Urban planning	23) Fisheries
2) Atmosphere	13) Industry	24) Forestry
3) Biodiversity	14) Local actions and development	25) Water management
4) Communication	15) Pollution reduction	26) Welfare and health infrastructures
5) Culture	16) Poverty reduction	27) Woman empowerment
6) Desertification	17) Research and Innovation	28) Territory and landscape
7) Education and training	18) Rural development	29) Tourism
8) Employment	19) Social Services	30) Trans-National and Inter-Regional Cooperation
9) Energy	20) Soil	31) Transports
10) Financing	21) Spatial planning	32) Waste
11) Fire prevention	22) Telecommunication and the information society	

Table 4. List of ecosystem categories. In evidence the related drop-down menu.

Ecosystem categories			
Arid/semi Arid	7	Short description of the practice	(free text area)
Hilly area	8 ☐	Sustainability domains	choose one or more
Island	9 ☐	Ecosystem categories	multiple choice response
Mountain area	10 ☐	Sector of intervention	multiple choice response
Rural area	11	Sorce of information	arid/semi arid hilly area Island mountain area rural area see area and costline urban area
See area and coastline	12	DESCRI	
Urban area	13 ☐	Name	
Wetland	14 ☐	IUCN Category	
Woodland	15 ☐	Other International Designation	
	16 ☐	National and Local Designations	
	17	Managing Authority	
	18	Size	(surface area)
	19	Number of staff	(permanent and/or temporary
	20 ☐	Monitoring system / Indicators	

CONCLUSIONS

A remarkable feature of the INNOVA protected area "management practices database" is its multiple-step nature, which allows users to accommodate their contribution while the tool evolves. They could quickly enter some "relevant practices" or rather explain in depth their management strategies by introducing "argumented INNOVA practices". Among the many characteristics built in the database that could contribute to increasing its potential effectiveness, we will name just a couple. The *Context-Mechanism-Outcome* framework could promote mutual learning by improving the ability of proponents to explain their cases, while offering readers the keys to understanding. A flexible *taxonomy* will streamline the search experience and foster integration with the INNOVA platform in general (check the *user specific web spaces* and the *dashboards*) and with some of its modules (the *guidelines*, the *indicators database*, *etc.*) alike.

However, the database is still in a testing phase, and a sound assessment of its effectiveness is dependent on a sustained experience by multiple users.

LINKS TO EXISTING MANAGEMENT PRACTICE DATABASES

Though only some regard Protected Areas, they are all interesting because either they address environmental issues in general, or they are about the management of projects and organizationS.

1. ec.europa.eu/regional_policy/projects/stories/index_en.cfm - EU regional administrations have placed here successful projects funded under the Structural and Cohesion policy.
2. www.parks.it/buone.pratiche/index.html - This database collects many practices addressing both economic development and environmental conservation policies in Italian protected areas.
3. www.eltis.org/case_study.phtml?mainID=458&id=458 European Local Transport Information Service (ELTIS), a case study database.
4. ec.europa.eu/energy/iebase/introduction.cfm and www.managenergy.net host two European Commission's public dissemination databases for non-technological projects in the field of energy efficiency and renewable energy sources.
5. the "Best Practices database" (www.bestpractices.org), a joint product of UN-HABITAT and few governmental organizations, heralds over 2,650 "proven solutions" from more than 140 countries to the common social, economic and environmental problems of an urbanizing world.
6. The Italian Environment Protection Agency (APAT) has set up and runs a searchable database of good practices to promote local sustainable development (http://www.gelso.apat.it/sito/bancaDati) that includes dozens of cases concerning protected areas.
7. http://www.agrifood-forum.net/practices/case_result.asp - the *United Nations Environment Programme* (UNEP) has collected several successful experiences about reducing environmental impacts in "agri-food production and consumption".
8. http://www.natura.org/sites_nni.html - An interactive map takes visitors to a selection of EU protected areas whose management practices are being recognized for their efforts to communicate the features and objectives of the NATURA 2000 network.
9. http://www.biodiv.org/programmes/outreach/cepa/projects/home.shtml - Under the aegis of UN Convention on Biological Diversity, the CEPA Case Studies and Best Practices database works towards a global communication, education and public awareness network.

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A BRIEF OVERVIEW OF ACTIVITIES CARRIED OUT IN CASE STUDIES

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Based on the analysis of the current degradation of natural and cultural resources, the INNOVA project was aimed at ***establishing common models for the management, planning and monitoring of high environmental value areas (HEVAS)*** in the framework of cooperation and exchange among the ARCHIMED area countries.

In order to achieve such an objective different activities were carried out and the obtained results are listed below.

- The INNOVA Platform: an innovative tool for the selection of indicators, for the automatic creation of Protected Area Management Effectiveness Report, and storage of the protected areas good practices in a database
- The INNOVA guidelines: web-based guidelines fully integrated with the above mentioned Platform, aimed at offering assistance for the management of protected areas. The guidelines also provide examples of threats faced by the Mediterranean protected areas as well as wide information on the legislation on protected areas of the Mediterranean Basin and of the Countries of the Pilot Project sites.
- The PASEMP (Protected Areas Sustainability Evaluation Monitoring Procedure): aimed at developing a participatory monitoring strategy for the long-term evaluation of the protected area sustainability objectives and the effectiveness of management.

To implement the practical activities of the project, the Administrative and the Scientific Networks identified six protected areas in the ARCHIMED area. The following main activities were carried out:

- Testing the INNOVA Platform, aimed at developing a list of indicators suitable for being implemented during the PASEMP.
- The PASEMP was tested in the 6 protected areas, characterized by very heterogeneous conditions (environmental, social, legislative, economic and cultural), as well as different IUCN designation categories and, accordingly, management objectives.

Table 1. INNOVA protected area characteristics

Protected area name	IUCN category	Designation	Extension (ha)
Cyprus: Arakapas, Dierona, Kalo Chorio,	IUCN category V	Area of exceptional natural beauty	370 hectares
Egypt: Omayed Natural Reserve	IUCN category V	Man and biosphere reserve	70.5 hectares
Greece: Lefka Ori National Park	IUCN category III	Biogenetic reserve, Man and biosphere reserve, Barcelona Convention, Natura2000 GR0043400614	52300 hectares (Natura 2000 site)
Italy: Palude del Conte e Duna Costiera di Porto Cesareo	IUCN IV	Natura 2000 IT9150028	898.3 hectares
Malta: Ghadira	IUCN IV	Natura 2000 MT0000015	0,3 hectares
Turkey: Igneada Forest	IUCN V	National Park	3140 hectares

Despite the different peculiarities of each site, the protected areas carried out the same activities (survey with protected area managers as well as stakeholders and local community) aimed at evaluating the sustainability of the undertaken management practices. Moreover, in all the Pilot Projects areas a stakeholders workshop for the prioritization of sustainability objectives and the identification of related indicators was held.

The activities implemented in the Pilot Project areas contributed to a better understanding of the major current problems the Mediterranean protected areas are facing, and of the protected area management objectives according to the sustainability framework.

The project represents an attempt to develop and implement a sustainability strategy for the Mediterranean protected areas, hence we hope that we can further strengthen our partnership with the ARCHIMED countries involved and continue working together.

In the following, the case studies of the Pilot Areas are reported to illustrate the main achievements of INNOVA and future prospects.

THE ITALIAN PILOT PROJECT: PALUDE DEL CONTE E DUNA COSTIERA, PORTO CESAREO

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DESCRIPTION OF PILOT PROJECT AREA: "PALUDE DEL CONTE E DUNA COSTIERA (PORTO CESAREO)"

The PA has a surface area of 898.29 ha. It currently extends from Punta Prosciutto (on the boundary of the Province of Taranto) to the "La Strea" Peninsula near the administrative limits of Porto Cesareo. The PA lies entirely within the administrative limits of Porto Cesareo, one of the main tourist resorts of the Salento.

The PA was set up by the Puglia regional administration with the law of March 15/2006. It is a regional nature reserve that belongs to the system of protected areas of the Puglia Region, as established in regional law 19/97. The reserve is classified as "oriented"; active ecological experimentation is thus allowed, including intervention aiming at the restoration or the reconstitution of degraded natural environments and equilibriums.

Currently the territory is divided into two parts: the central Zone and the buffer zone.

The PA lies primarily along the coast:

- It continues uninterrupted between Punta Prosciutto and Torre Lapillo; in this sector the environment is characterized by dunes with priority habitat (junipers)
- The sandy coast alternates with rocky patches where the habitat is that of rocky coast vegetation
- The remaining part of the coastline is characterized by seven islands of which two are of large dimensions. The largest is called "Rabbit Island": it is often visited by tourists and schools.
- A special environment is that of the Strea peninsula, a strip of dry land with various types of habitat: salt steppes, pseudo-steppe with grasses and annuals, habitats of community interest and some maquis and garrigues.

In contrast, the part of the protected area lying further inland is characterized by reed beds, maquis and garrigues. There is also some reforestation.

Of considerable landscape and geomorphological value are the "Spunnulate": geomorphological forms similar to dolines, which originated near the coast as a result of the action of the sea combined with the erosion caused by the dissolution of the carbonatic rocks by rainwater. They are generally filled with water in contact with the sea.

Another part of the PA that coincides with the buffer zone is affected by agriculture but there are numerous uncultivated areas where agricultural practices have been abandoned.

Observing the territory, it seems that the PA is fragmented into a number of patches: the greatest nucleus of the PA is situated at the boundary of the Province of Taranto where, from the environmental point of view, it is contiguous with another regional protected area.

The other nucleuses are mostly separated one from the other. This aspect is linked to the intense coastal urbanization.

Fig. 1. An example of “Spunnulata”, filled with water

The PA belongs to IUCN Category IV: Habitat / Species Management Area - protected area managed mainly for conservation through management intervention. Currently there is no management plan for the protected area, so the sustainability objectives have not been defined. It is necessary to conduct a campaign to raise the awareness of the local community and tourists concerning the objectives and the development opportunities of the Protected Area, promoting participatory management. It is also necessary to support the PA in the scientific aspects of management, because the PA does not have its own staff. However, many studies of the PA have been carried out by the DiSTeBA - Botanic Laboratory of the University of the Salento (Lecce).

COMPONENTS OF PASEMP PROCEDURE CARRIED OUT

The Botanic Laboratory of DiSTeBA has carried out all the Pilot Project Area activities foreseen by the PASEMP: the laboratory have realized the interviews to the PA Manager, stakeholders of Protected Area and local community.

The selection of the stakeholders was achieved with the assistance of the Manager of the protected area and took account of the need to create a set of stakeholders from different backgrounds.

The data gathered during the interviews were computerised and processed in order to obtain information regarding the strengths, threats and sustainability objectives defined by the stakeholders.

The involvement of local communities in the management of the natural protected areas is thus essential in order to reach conservation objectives. The participation of the local community is also a fundamental aspect of the PASEM procedure (Protected Area Sustainability Evaluation and Monitoring Procedure) adopted in the Innova project.

The interviews with the local population were carried out door to door, considering both the nature of the questionnaire used and the recent institution of the protected area.

The interviews were carried out among a representative sample of 224 families drawn from a total of 1257 (data from the 14th census of the population) resident in the municipality of Porto Cesareo. It should be pointed out that the residents present in the protected area account for only a small part of the local population. Therefore, the interviews were conducted mostly outside the boundaries of the protected area but within the administrative limits of the municipality of Porto Cesareo, along the whole of the coastal strip under study. Within the territory of the municipality there are two other built up areas in addition to the town itself. These are the two coastal resorts of Torre Lapillo and Punta Prosciutto. In these localities the houses are occupied mostly on a seasonal basis, associated with beach tourism. This aspect made it necessary to prolong the interviewing period until the summer, in order to obtain a better spatial distribution of the places where the survey was conducted.

At the end of this type of work the Laboratory of Systematic Botany and Plant Ecology of the Department of Biological and Environmental Science and Technology (DiSTeBA) has organized the local workshop with the stakeholders as the following paragraph shows.

STRENGTHS, THREATS, OBJECTIVES AND SUSTAINABILITY INDICATORS OF THE PA AS DEFINED IN THE LOCAL WORKSHOP HELD ON THE 8TH OF OCTOBER 2007 AT THE TORRE FORTICATA IN TORRE LAPILLO - MUNICIPALITY OF PORTO CESAREO (LE)

The local workshop, held on the 8th of October 2007, was organised by the Laboratory of Systematic Botany and Plant Ecology of the Department of Biological and Environmental Science and Technology (DiSTeBA) in collaboration with the Mediterranean Institute of Agronomy in Bari.

Organisation and benefits of the workshop

The creation of the workshop and the working procedure adopted represent a new development in the context of the planning and management of protected areas in the Puglia Region. The involvement of the various players operating in the protected territory and its surrounding area is essential in order to build consensus and draw up management policies that are able to guarantee the conservation of the natural resources. The need to take account of different points of view led to the stakeholders involved in the project and invited to participate in workshop being selected with a view to obtaining a heterogeneous background of knowledge and experience, integrating environmental, social, economic and institutional interests as much as possible.

The beginning of the group work envisaged in the workshop was preceded by a short presentation of the “Innova” Project and its current state of progress, and by an explanation of the way in which the work sessions of the workshop would take place.

Fig. 2. Local workshop in Torre Lapillo (Le)

The workshop was divided into three interactive work sessions: during the first session, the stakeholders, via a group activity coordinated by the leaders of the project, identified the environmental, social and economic strengths of the protected area and the threats to it.

In the second session the stakeholders developed sustainability objectives specific to the site, discussing the various dimensions of sustainability (environmental, social, economic and institutional) and drawing up a final list of objectives to include in the management plan of the protected area.

In the third session the participants in the workshop selected a set of priority indicators applicable to the site on the basis of the sustainability objectives chosen in the second session.

Via this process, the stakeholders were made aware of their respective points of view and of the needs of the local community; they expressed their appreciation of the workshop and their hope that the positive process of cooperation began at the workshop would continue in the future.

Identification of strengths and threats to the protected area - *Session 1*

In session 1 the stakeholders were subdivided into three work groups. The creation of the groups took account of the different background of each stakeholder in such a way as to bring together their different interests and relationships to the territory.

Each group was asked to list the environmental, social and economic strengths of the protected area, as well as the existing or potential threats to it, on special post-its. The group coordinators facilitated the process of discussion among the various stakeholders, who attached the post-its on their respective posters.

The coordinators gathered the information that could be inferred from the posters and presented it to the participants, who were then also presented with the results of the survey carried out among the local community of Porto Cesareo regarding the strengths of and threats to the protected area.

- **Strengths**

With reference to the environmental strengths (Table 1), it can be seen that the stakeholders had a clear understanding of the value of the biodiversity and habitats that characterise the natural protected area. This demonstrates a good perception of the territory's natural characteristics. The importance of the karst phenomena associated with the so-called “spunnulate” was also stressed. From the geomorphological point of view these features are similar to collapsed dolines; they were formed by the subsidence of the superficial calcarenite rock near the waterline as a result of the collapse of pre-existing underground karstic cavities. The depressions that are created by this process are often filled with groundwater, typically brackish due to the vicinity of the sea.

Another strength is the presence of bodies of water and significant wetlands in the protected area. As a result of the land reclamation that took place following the Second World War, the territory today is characterised by a network of canals that drain surface run-off and emerging groundwater into the sea. This system of canals has prevented the territory from becoming marshy and influencing local settlement patterns.

Table 1. Environmental strengths of the protected area

Biodiversity and presence of priority habit ats and habitats of community importance under directive 92/43/EC
Natural state
Presence of water bodies and wetlands
Karstic system and special geomorphological formations (“spunnulate”)

Concerning socio-cultural strengths (Table 2), the stakeholders recognised the importance of the protected area in relation to environmental education and scientific research, without however neglecting the possibility of revitalising ancient local traditions, which have been in decline for some time. In this context, the importance of local historical and architectural heritage items that testify to the history of the territory (traditional farmhouses and fortified towers) was emphasised.

Table 2. Socio-cultural strengths of the protected area

Educational and scientific value of the protected area
Value of ancient local traditions
Value of historical and architectural heritage items present in the territory

The discussion of the area's economic strengths focused on the benefits deriving from the tourism and hotel trade. Indeed, an important characteristic of the territory is beach tourism, which during summer entails a considerable increase in the population of the territory. While on the one hand this aspect represents an advantage, on the other it is essential that the tourism itself be managed in a sustainable way, so as to guarantee an eco-compatible use of the natural resources. For example, the participants proposed the creation of services managed by local residents in order to ensure close

protection and supervision of the territory and bring economic benefits to the local community. In this regard the possibility was discussed of promoting so-called green tourism, by integrating the educational and scientific value of the protected area with the marketing of characteristic local products. For the latter, it was suggested that a form of quality certification be adopted in order to create a system of products linked to the natural protected area.

Table 3. Economic strengths of the protected area

Beach tourism
Use of local resources (beaches, fishing) as a source of income
Green tourism
Characteristic local products

To summarise, the stakeholders recognised a system of strengths that needs to be efficiently managed in order to avoid degradation or loss due to the threats present in the territory, as specified in the following paragraph.

- **Threats**

The stakeholders identified a large number of threats within the territory of the protected area. Broadly speaking, these threats run directly counter to the environmental, social and economic strengths, while there do not seem to be any threats at the level of governance. Table 4 shows their classification. The table shows that the threats are predominantly environmental. The workshop discussions confirmed that there is an awareness that the environmental strengths are subject to various types of pressure: the stakeholders perceive that there is a need to implement sustainable forms of tourism, improving services and reducing summer pressure on the coast, which entails considerable stress for the dunal environment. The phenomenon of unauthorised construction seen in the past has contributed considerably to the fragmentation of the natural habitats, the protection of which is thus now necessary.

With reference to economic and social threats, the discussions highlighted the inadequacy of the financial resources available for the protected area and thus the difficulty in implementing the necessary measures. The Manager of the protected area did however stress that the territorial plan for the protected area is currently being drawn up.

Table 4. Threats to the protected area

Environmental	Social	
Waste	Endemic diseases	Limited financial resources
Development of tourism	Lack of drinking water	Unsustainable use of resources
Roads and communication routes	Camps for travellers	
Summer tourist pressure	Overpopulation	
Loss of biodiversity	Crime	
Fires		
Unauthorised building		
Disturbance of hydrological equilibria		
Hunting		
Forest clearance		
Pressure on the dunes		
Vehicles in protected area		
Fragmentation of ecosystems		

Identification of sustainability objectives - *Session 2*

In drawing up a management plan for a protected area, the definition of sustainability objectives is clearly fundamental. It makes it possible to rationalise and assign priorities concerning environmental, social, economic and institutional planning.

In this phase of the workshop the stakeholders thus identified 2 sustainability objectives for each of the four categories proposed (environmental, socio-cultural, economic and institutional), expressing their preferences on the 4 posters displaying a series of sustainability objectives. This series is the same as the one shown in the questionnaires used for the interviews. The posters also showed the results of the survey conducted among the local community: these results were momentarily covered up so as not to influence the choices of the stakeholders. Once this phase was concluded, the views of the local community were revealed and a discussion was initiated to compare the choices of the stakeholders with those expressed by the local community.

Fig. 3. Participants engaged in sustainability objectives determation exercise

Table 5 shows the eight most important sustainability objectives chosen by the stakeholders for the four sustainability dimensions. It should be specified that for the institutional dimension, two sustainability objectives were considered equally important, so there were nine objectives selected in total. During the discussion which concluded this phase, the participants affirmed the importance of all the sustainability objectives proposed, even considering certain differences expressed in the interviews with members of the local community.

Table 5. The most important sustainability objectives

	Score
Environmental dimension	
Protect biodiversity	6
Promote sustainable use of resources	4
Social dimension	
Maintain or recover cultural strengths and traditions	7
Provide opportunities for education	6
Economic dimension	
Promote the local economy	6
Provide opportunities for employment	5
Institutional dimension	
Ensure the development and smooth implementation of the management plan of the protected area	5
Provide institutional and financial regulation applicable to the management of the Protected area	4
Monitor the sustainability of activities in the protected area and the presence of means for dissemination of information	4

Identification of sustainability indicators - *Session 3*

The term “indicator” usually refers to any instrument which provides general information on a more complex phenomenon and which has a broader significance; an instrument that reveals a pattern or trend that is not immediately perceptible. The significance of the indicator thus extends beyond the parameter that it actually measures. The characteristics of indicators may be summarised in the following two points: indicators quantify information, so that their meaning is easier to understand and more obvious; indicators simplify information pertaining to more complex phenomena, thus facilitating communication and comparison. Indicators may be regarded as fragments of information that reflect the state of a wider system, like examining a large picture by looking at certain small details. Indicators can be seen as “snapshots” of the conditions obtaining in the system at a specific time, or used in the context of regular monitoring. Thus, for example, knowing the overall state of the environmental system enables us to take thought-out and valid decisions concerning the environmental policies to be adopted in our cities and rural areas. The use of indicators in support of policy-making has become common practice even in international and European organisations (see for example, Agenda 21, Rio de Janeiro 1992). The evaluation of the various components of sustainability requires the adoption of a multidisciplinary approach that enables the specification of objectives and monitoring procedures that are closely linked. During the workshop, efforts were thus made to propose sustainability indicators that were not isolated but as integrated as possible. To do this three worktables were set up and the stakeholders were divided into three groups. With the help of the coordinators, each group was able to choose from a specially created list the indicators relevant to the various dimensions of sustainability and linked to the sustainability objectives identified. The list of indicators used had been drawn up before the workshop on the basis of the results of the questionnaires answered in the previous months.

Table 6. Most important indicators chosen

Environmental dimension
N° of solar panels installed every year
Ratio of endangered species
Fragmentation of the agricultural, forest and natural ecosystems
Loss of wetlands
Chemical State of the Subterranean waters (CSUW)
Urbanisation Index
N° of marginal areas that have not been re-naturalised
N° of paths and information boards
Social dimension
Existence of management accords between stakeholders (verbal, written, formal and informal)
N° of publications regarding environmental information
N° of projects for environmental education in schools
N° of events for the promotion of local culture
Economic dimension
Amount of money released by public institutions for the management of the PA
N° of “agri-tourism” establishments
N° of tourist presences aware of the activities of the park
Seasonality index
N° of VAT numbers issued or lapsing in a year
N° of certified organic farms
Institutional dimension
N° of meetings for the creation of the management plan
N° of funded/refunded projects
N° of subjects involved by the PA management
N° of staff employed in monitoring the PA
N° of illegally built constructions acquired and converted/demolished
N° of personnel training courses in the Protected area

MONITORING SITUATION

The indicators proposed and perfected during the local workshop are linked in most cases to elements for which it is necessary to organise the retrieval and analysis of available data.

Most of the data available to date concerns the natural characteristics of the protected area. These can be used to perform spatial analyses as part of a Geographical Information System, for example to assess the degree of fragmentation of natural habitats. However, the absence of a management plan for the protected area and the fact that it was established only recently complicate the search for indicators that are already measurable, especially regarding the social and institutional dimensions. The next objective therefore should be to organise the retrieval of data, in the hope that the protected area can move rapidly from the merely constitutive phase to that of active management.

CONCLUSIONS

To summarise, the workshop served on the one hand to understand and define the priorities, taking account of what emerged from the survey conducted among the local community, and on the other to facilitate the process of communication and exchange of ideas between the various stakeholders and the convergence of the different interests they represent. The participants expressed their general satisfaction with the methods adopted, as is seen from the responses to the questionnaire used for the assessment of the workshop, distributed at the conclusion of business.

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THE TURKISH PILOT PROJECT: IGNEADA LONGOS FORESTS

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DESCRIPTION OF PILOT PROJECT AREA IGNEADA LONGOS FORESTS AND LEGISLATIVE STATUS

Igneada Longos Forests is located on the Black Sea Coast in Kırklareli District in European Turkey (Fig. 1). It has a range of east slope habitats leading from dry oak forest through to alluvial longos forest, Black Sea coastal dunes and the shallow marine margin. Freshwater streams draining the hill slopes are impounded by the dunes to form a series of three shallow lakes with surrounding swamp habitat. A range of the habitats are of national and international importance in their own right. As an intact sequence complete with transitions and intermediate communities, the ecosystem is of particular importance. There are few locations around the Black Sea with such habitat sequences and none are comparable in size or condition to Igneada.

Nearly all of the land within the Igneada Protected Area is owned by the State, and is under the management authority of the Ministry of Environment and Forestry (MoEF, 2007). Igneada Longos Forests were designated as a national park on 13th November, 2007 (Official Journal, 2007; http://www.milliparklar.gov.tr). The area has also been designated as an “Important Plant Area” (IPA) and “Important Bird Area” (IBA) due to its appreciable biodiversity (Yarar, M and G. Magnin, 1997). The area is an outstanding site in terms of biodiversity, where swamp forests, wetlands and coastal dunes together create a complex of ecosystems.

Fig. 1. Location of Igneada Longos Forests

The northern parts of Istranca Mountains are basically composed of granite, and the Bulgarian part is of limestone. Since the Iron Age the vast sources of iron and copper found in the alluvial accumulations along the rivers have been extracted by people. Since the creation of coasts and dunes during the Ice Age the shallow bays on the Black Sea have been filled with alluvial sediments. Between the alluvial riverbed and the costal dunes bay lakes emerged.

Igneada Longos Forests can be grouped in geomorphologic zones; shallow sea shelf, barrier dunes, subsidence plains, slopes and valleys. The hydrology of the area is dominated by the mountain streams and the sea. Mountain streams flow down from the hill slopes, supplemented in spring by snow-melt, creating erosive torrents. At this stage they carry large particles from sands and gravels through small boulders which are deposited in the first areas of the deposition plain. Finer silts are carried far out into the longos forests and into the shallow lakes during times of flood. It is within the Western Black Sea climatic zone. Soils can be classified in three groups as; brown forest soils without lime, alluvial-colluvial soils, alluvial coast swamps.

Igneada Longos Forest is of high landscape value because of its extent and naturalness, and also because of its aesthetic beauty (Fig. 2). It essentially consists of a single landscape type; coastal forested hill slopes. Here the eastern slopes of Istranca Mountains tumble toward the sea, with a narrow coastal depositional plain and dune system between the mountains and the sea. This broad landscape type may be subdivided into units which broadly correspond to the geomorphologic zones. The hill slope unit is given definition by the distinctive oak forest vegetation cover which correlates closely with topography and soils. The alluvial floodplain area is divided into two landscape units; the forested longos, distinctive in its seasonal flooding and consequent *Alnus-Fraxinus* forest type, and the lakes with their associated swamps.

Fig. 2. A view from Igneada Longos Forests

Since Prehistoric Age, this region of Istranca Mountains has been special in terms of forestry, hunting and mining (Uyanik, 2007). Both wet alluvial longos forest and dry hill slope *Quercus* forest are likely to be ancient although grazing was most probably present in most forests and open land. Long term unbroken continuity of habitat species is a key element in determining their biological richness. Most land uses can be grouped as forestry, agricultural practices and intensive land use.

The streams flowing from Istranca Mountains into the Black Sea discharge into the lakes and their surrounding swamps before reaching the Black Sea. The lake and the swamp area, which has a restricted connection with the sea due to the presence of the dunes, inundate upstream and laterally during spring time to flood the flat land. There are three separate pieces of longos forests in Igneada. They are Erikli (555ha), Mert (782ha) and Saka (782ha) (MoEF, 2007).

Igneada Longos Forests is located in administrative boundaries of the district of Demirkoy (of the province of Kirklareli); and covers territories of three residential units: the sub-district of Igneada, and villages of Avcilar and Sivriler. The protected area is in direct or indirect interaction with the people who are permanently or temporarily residing in those areas, the people who visit the area and those who use the natural resources there. The main sources of income in the area include tourism, fishing, forestry, agriculture and stock-breeding. While trade and tourism, especially renting houses and flats and fishing, are the most important economic activities in Igneada through June-August period., Villagers work in

forests, grow crops and undertake stock-breeding based on free grazing in order to meet their needs for meat and dairy products.

OUTPUT OF THE IMPLEMENTATION INNOVA PROTECTED AREA SUSTAINABILITY EVALUATION AND MONITORING PROCEDURE (PASEMP)

Summary of Protected Area Effectiveness Evaluation Results

This section presents a summary of the management effectiveness results. The results are presented as an averaged score from a number of relevant questions. The scoring system refers to the management cycle stages namely ***Context, Planning, Input, Processes, Outputs, Outcomes*** and is presented in order to help protected area managers identify the areas which require attention and improvement regarding the management as well as to obtain an appreciation of the areas where they are performing well according to the aforementioned international standards (Kalliope et al., 2007).

The rapid appraisal was completed by the protected area manager in Igneada, Kirklareli on 25th April, 2007. The protected area whose management effectiveness was evaluated is Igneada, located in Kirklareli/Demirkoy (Fig. 1). It has the national designation and was classified as a national park on 13th November, 2007. The relevant to the protected area legislation and policies are; National Parks Law. The protected area management authority for pilot project area is Turkish Government (Ministry of Environment and Forestry, General Directorate of Nature Conservation and National Parks).

The protected area obtained an overall management effectiveness score of **56%** which indicates ***good management performance*** (Fig. 3).

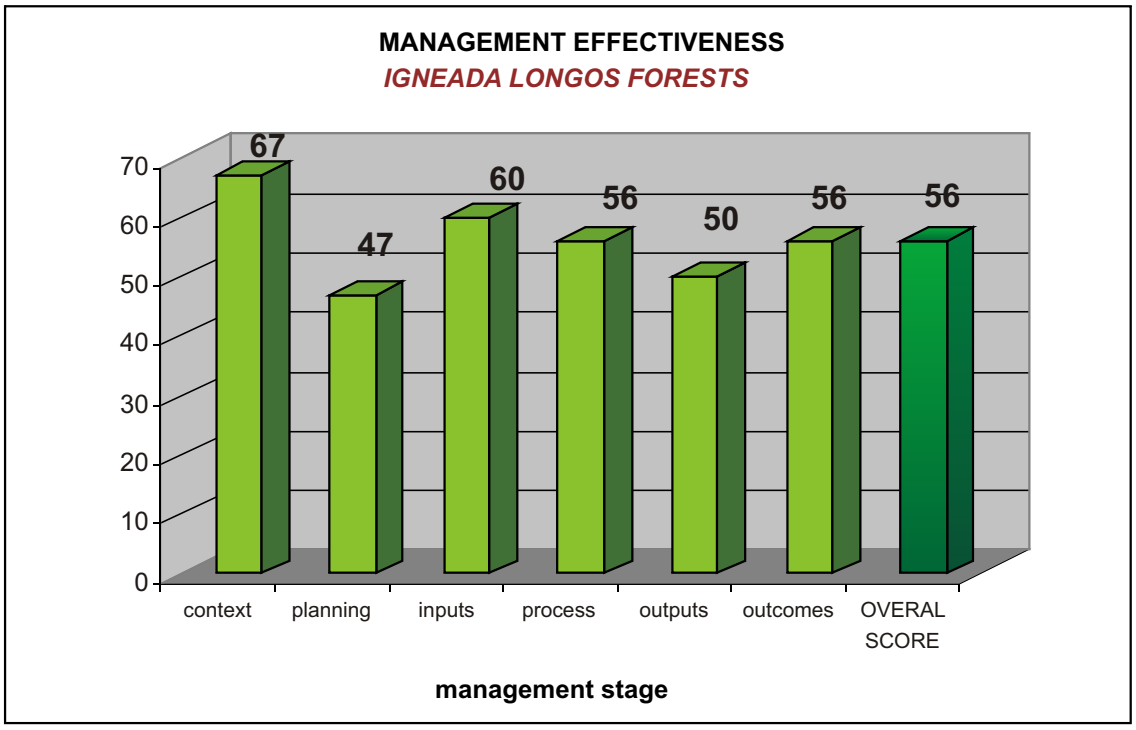

Fig. 3. Management Effectiveness Evaluation Results

According to the context and planning effectiveness of the pilot project area, protected area manager identified the following values, threats and sustainability objectives to be the most important (Table 1; 2).

Table 1. Protected Area Manager Identified Main Sustainability Values and Threats to Site

Environmental Values	Social Values	Economic Values	Main Threats
The PA has relatively high levels of biodiversity.	The PA provides important physical & mental health improvement opportunities for the community.	The PA is an important source of employment for the local communities.	overgrazing
The PA includes important water bodies and wetlands.	The PA has unusual features of aesthetic importance.	The PA has high educational or scientific value.	Invasive plants

Table 2. Protected Area Manager Identified Priority Sustainability Objectives to Site

Environmental Objectives	Social Objectives	Economic Objectives	Governance Objectives
To protect biodiversity	To maintain or restore cultural and heritage values	To promote the local economy	To promote public participation in protected area management and decision making
To protect the aesthetic scientific value of the environment	To provide education opportunities	To enable localities to be efficient and competitive	To ensure consideration and compliance of protected areas with legislation and policies

Regarding input, process and outcome effectiveness evaluation, the protected area obtained an average evaluation score of ***good performance***. The pilot project area-Igneada Longos Forests was selected as one of the four project sites of the Biodiversity and Natural Resources Management Project between the years 2000-2007 financed by Global Environment Facility (GEF-World Bank) and Turkish Government.

Stakeholder Interviews

A Stakeholder Identification Questions were answered in order to identify the main stakeholders. Having answered these questions, twelve stakeholders were selected to be involved in the Indicator Selection Workshop (Stakeholders Workshop) and were also interviewed using the Stakeholder Rapid Appraisal. The Stakeholder Sustainability Rapid Questionnaire was completed by twelve stakeholders using the INNOVA Stakeholder Identification Process (Kalliope et al., 2007). Stakeholders were of academicians (three disciplines), an agricultural engineer, local security representative, Mayor of Igneada, Headman of Sivriler Village, a representative from Public Education, Vice Manager of Forest Directorate, a representative from Culture and Tourism Directorate, representatives of NGO's (IDE Association and WWF) and a weed cutter.

Community Survey

In order to obtain information from the protected area local community the methodology followed was that of a "door to door" household survey. The standardized INNOVA Community Consultation Questionnaire was used on subjects of 103 households. Data was collected over the period of June-September 2007 through surveys conducted from 9 am to 7 pm everyday. The data was analyzed using SPSS and Excel by Mediterranean Agronomic Institute of Chania (MAICh). The results of this survey were then summarized in Turkish and sent to stakeholders a week before the Stakeholder Workshop in order to let them consider the results prior to the workshop.

In total, 103 households were surveyed to determine local community relation to the protected area, Igneada Longos Forests. The survey was carried out in the district of Igneada Municipality which includes Avcilar and Sivriler villages, Deniz and Yenimahalle neighborhoods. The distribution of local community

population is 5.9% from Avcilar village, 23.5% from Deniz neighborhood, 24.5% from Sivriler village and 45.1% from Yenimahalle neighborhood.

Demographic and Local Community Relation to Protected Area

68.6% of local community survey respondents were male and 31.4 female. The imbalance in gender is due to a cultural tendency that the men represent the household. Additionally, a considerable proportion of the interviews were made in village cafes where only men gather. The age distribution of respondents shows a higher proportion of the elderly with 68.8 % whereas the youngest age group (18-24 years of age) was represented by 8.8% and it was 13.7% for the age group between the ages of 25-34 years. This proportion also represents the age distribution of the whole local population which is characterized by an aging population due to the migration of young people for educational and work purposes. With regard to the education level of the respondents it is apparent that it is considerably low with great percentages (53.9%) of elementary school graduates among the respondents with no further education. This is a significant finding, which requires attention as compulsory education is 8 years in Turkey, i.e. education until the age of 15. Tertiary education is 16.7%. An important aspect of this survey is the determination of household activities of the local community and their relation to the protected area. With regard to the main economic activities of the household predominance is evidently the agricultural sector (38.2% agriculture, hunting and forestry). It is followed by activities of households with 19.6% and education sector with 12.7%.

These occupation statistics illustrate that a larger percentages of the population are dependent on agriculture in relation to the national average. Additionally, when participants where asked to state their relationship with the protected area 30.4% claimed that they used protected area for recreation, 19.6% used resources from protected area, 18.4% were residents within protected area, 12.7% worked in protected area. The above points illustrate the need for extensive consultation with regard to the management of the protected area, firstly, because there appears to be a lack of information and secondly because of high dependency of local population on the actual land itself.

The questionnaire also aimed at answering the question whether the local community had been affected by the protected area (in terms of its designation status). 41% of respondents stated that they had not been affected, whereas 49% felt they had been affected in a negative way.

When questioned how they had been affected, a range of answers were obtained. The majority of the respondents felt to have been affected in a negative way by the designation status of the protected area. Some stating that they had lost land ownership (49%). 40.2% felt that the presence of the protected area had not affected them whereas only 7.8% perceived the value of the protected area in terms of the recreation opportunities it provides.

Perceptions of Problems in Protected Area and Recommendations for Improvement

The survey requested from the respondents to list three main problems or threats to the protected area. Respondents perceived a range of problems which were relevant to all sustainability dimensions - environmental, economic, social and governance dimensions. *Restricted economic development* is the main local community perceived problem/threat in the economic dimension. Two main problems/threats in the governance dimension are *lack of participation and information provision* and *problematic protected area management/conservation measures* follow them. *Unemployment* and *restricted use of protected area resources and land* are following problems/threats in the economic dimension. *Over exploitation of resources* (timber, sand, and hunting) and *pollution* are the main problems/threats relevant to environmental dimension.

The local community, through the survey, proposed a number of recommendations regarding measures and actions which should be taken in order to overcome the issues and improve the state of the protected area. Improving environmental conditions in general was the main environmental recommendation with 28.5%. It was followed by protecting biodiversity with 3.9%. A number of economic recommendations where made which aimed at the diversification of income sources and creating jobs. These recommendations are closely related to the social issue of giving migration from the area. It is encouraging that the local community recognized the need for sustainable sources for income generation proposing the need for eco or agro tourism development rather than mass tourism as well as the support of traditional professions. With regard to governance recommendations, increasing public participation is 37.3%. It is followed by improving protected area management with 3.9%.

Stakeholder Workshop

Stakeholder Workshop was held on the 18th November 2007 in Igneada, Kirklareli under the title ***"Defining the Values, Threats, Objectives and Sustainability Monitoring Strategy of the Igneada Protected Area"*** (Fig. 4). It was organized jointly by Ege University, Faculty of Agriculture and Ministry of Environment and Forestry, Directorate of Nature Conservation and National Park as part of the work and deliverables of the INNOVA ***"Established Common Models of Integrated Sustainable Monitoring, Planning and Management of the High Environmental Value Areas to Control Natural Resources Degradation"*** Project.

To aim of the workshop was to establish stakeholder perceptions with regard to protected area values, threats and priority, sustainability objectives, which constitute an essential element of the PASEM Procedure (Kalliope et al., 2007). Six stakeholder interviews were conducted which were characterized in a range of different backgrounds/disciplines and interests. The interviews were structured and required the completion of a questionnaire. The analyses were carried out using SPSS and Excel by MAICh (Mediterranean Agronomic Institute of Chania).

Fig. 4. The Stakeholder Workshop in Igneada, Kirklareli, Turkey

Results of Stakeholder Workshop

This section contains a summary of the results obtained from the stakeholder workshop under the title ***"Defining the Values, Threats, Objectives and Sustainability Monitoring Strategy of the Igneada Protected Area"***.

In defining the threats, stakeholders were asked to note down the most important two environmental, socio-cultural, and economic threats to the protected area on individual note sheets. They were also asked to discuss the threats which they perceived the protected area is facing. Post-its were then collated on posters for everyone to review and an open discussion of the results was carried out. Importantly, when reviewing the results, participants were presented with the list of threats which the local community perceived the protected area was facing, which stimulated the discussions to a further extend.

Defining threats appeared to be a topic which participants had a lot to comments on post its with threats collected (Fig. 5). These were initially put on one poster subsequently summarized and clustered into ***environmental, social, economic and governance related threats.*** Overall key ***environmental themes*** related to the threat of loss of biodiversity and land degradation through *over exploitation of*

natural resources. *Harbor and road constructions* were considered as main threats as well as *dam construction*. *Water project* in order to supply water for Istanbul was also considered a threat to the protected area. A number of ***social threats*** were mentioned by participants with a key theme *lack of environmental awareness*. Another threat recorded by participants was the *increase of second houses*. They also recorded the *lack of balance between use and protection*. With regard to ***economic threats*** an overarching theme occurred which demand economic precautions for local community besides protection of the area. Another economic threat was harbor construction indicated by the participants as an environmental threat. *Forest occupation and sand draw* were recorded by participants as a ***governance threat*** to the protected area. *The lack of good presentation of protected area* is another threat related to the governance. According to the questionnaire for identification of protected area threats, the stakeholders listed and ranked the threats in terms of importance. The most important threat recorded was *dam construction projects* related to water management. It was followed by *housing*, *overgrazing*, *harbor construction* and *land degradation*.

Fig. 5. Participants defining the Threats to the Protected Area

On this basis participants were presented with four lists of ***sustainability objectives***, each list providing an equal number of objectives relevant to a specific sustainability dimension e.g. economic, social etc. A prioritization exercise was carried out whereby participants who had been provided with stick dots were asked to select the two most important objectives of each sustainability dimension, for Igneada Longos Forests protected area. It is important to note that this exercise was carried out on an individual basis with stakeholders through interviews. Therefore the results of the interviews were made available at the end of the prioritization exercise for participants to note whether there had been a shift in objectives priorities due to the workshop and discussions held or survey results. A plenary open discussion was held and a consensus was achieved in defining a final set of objectives.

Social, economic and governance objectives were considered a priority to this particular protected area. *Maintaining or restoring cultural and heritage values* and also *providing a safe environment for people to work and live in* were recorded by stakeholders ***as social objectives***. ***Environmental objectives*** recorded by stakeholders were *protection of biodiversity, aesthetic elements and scientific value of the environment*. ***Economic objectives*** recorded by stakeholders were; *enabling locals to be efficient and competitive* and *providing adequate services to serve the local area.* Another ***objective*** related to the ***governance*** was to *ensure the implementation of holistic risk assessment and environmental management process* and *promote public participation in protected area management and decision making*.

The aim of the defining sustainability indicators session was for participants to select or develop indicators for each sustainability dimension. As ***social indicators***, *publications relating to the protected area, number and conditions of houses in Igneada, Kakava festivals, Bocuk entertainments and realization of maize harvest fest* were recorded by stakeholders. *Annual quantity of sold lands, annual migration, and local/foreign population rates in service sector, numbers of cooperatives and their members and educational activities realized by NGOs* were mentioned for ***economic indicators***. ***Environmental indicators*** were recorded by stakeholders such as; *monitoring of indicator species; water level and quality; width and height of coastal dunes; Lake surface areas; population of migratory birds*. ***Objectives*** related to the ***governance*** were recorded as changes of land use, organic agriculture, local community questionnaires, the ratio of public participation in educational and public awareness activities and the variability of education and awareness activities.

CONCLUSION

In the studies conducted in Igneada Longos Forests case, the protected area manager, local community and other stakeholders participated in the efforts through workshops and questionnaires. The comments of the stakeholders are given below.

At the end of the workshop participants were asked to answer a questionnaire which had likert- scale type satisfaction questions with a scale ranging from 1 (poor) 10 (excellent). Overall participants concluded that the workshop was beneficiary providing an average score of 8.3 out of 10 and was perceived that it should be applied to other protected areas (9 out of 10).

The stakeholders criticized the insufficient participation to the workshop and absence of local authority but they appreciated the coordination of the project, indication of their ideas clearly, identifying of sustainability values, communication and connection between stakeholders, and excellent organization and flowchart about the workshop. They made recommendations for improvement of the process such as more participation, public awareness, more workshops, and the necessity of cooperation and coordination between local community and administration authority for the protected area.

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THE MALTESE PILOT PROJECT: FORESTA 2000, GHADIRA

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DESCRIPTION OF PILOT AREA

The site lies along the narrowest stretch of land of the island of Malta covering an area of 104 hectares. The site is composed of two hillsides enclosing a fairly wide valley floor. The hillsides fall gradually to meet the valley floor that in turn has a slight gradient running west to east, that is from ic-Cumnija (with 50m high cliffs) down towards the Mellieha bay, at sea level. The area has been extensively used and altered by human activity, often to the detriment of the natural environment and the aesthetic qualities of the site.

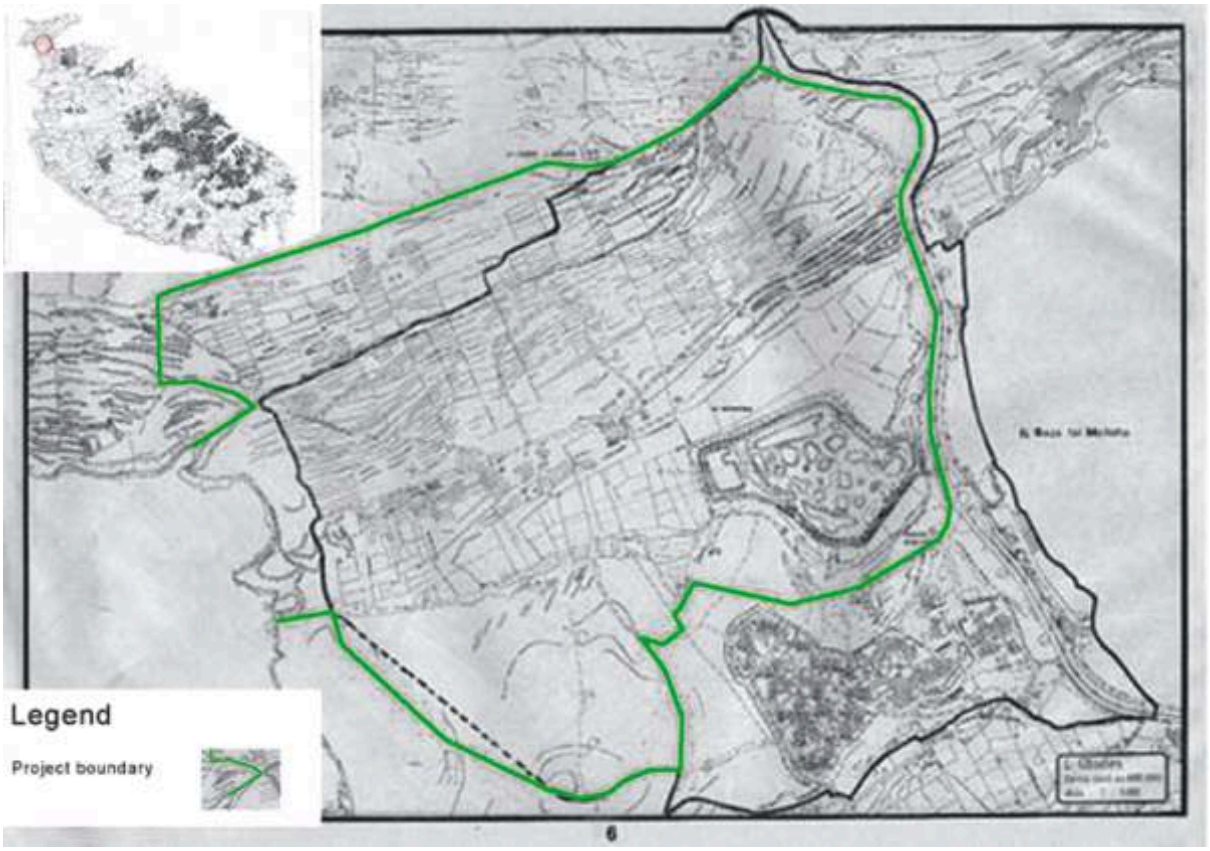

Fig. 1. The Foresta 2000 site

The project area is Government owned although scattered parcels are leased for agricultural purposes. Most of the agricultural activity is carried out on the valley floor where soil is deeper and more fertile. Agriculture predominates mainly in the form of small holdings enclosed in rubble walls. To the east however the site is dominated by the Ghadira wetland. The wetland is composed of brackish water and benefits migratory water birds and other wetland wildlife.

The south side of the area is dominated by the Mellieha Holiday Complex, and to the west the terrain changes to garigue typical of local exposed environments. To the north the landscape is composed mainly of abandoned fields, some of which were afforested with a mixture of Aleppo pines (*Pinus halepensis*) and blue wattle (*Acacia sp.*) some 20 years back. In areas not afforested and where the rubble walls have collapsed, soil degradation is severe exposing the underlying rock in

areas. A small percentage of the fields are under cultivation. At the foot of the hill, to the east of the site, are a considerable number of huts used as summer holiday retreats. The east part of the slope is composed of exposed blue clay. This area is devoid of trees and agricultural fields and until the commencement of this project, off-road driving was commonly practiced, causing severe erosion problems. The ridge is dominated by 'it-Torri l-Ahmar' a 17-century military outpost. The area to the west of the site is mainly composed of a landfill site. A sewage treatment plant is being constructed within this area.

The site is very exposed to the weather. However, the south-facing slope is largely sheltered from the prevailing Northwest wind. Exposure to the elements has resulted in soil erosion and stunted vegetation. In areas, surface water run off has contributed to soil erosion. This is evident where rubble walls have been breached.

With the exception to the nature reserve, land under cultivation and private residential areas, the site is open to public access. Due to several elements of historical and ecological value the area is popular with walkers and picnickers especially during the winter months. The installation of metal gates to deter off-road driving and camping has reduced the frequency of people visiting the forested areas. However Fort St. Agatha still attracts lots of visitors especially tourists.

Fig. 2. An aerial view of the area: the Ghadira wetland is visible in the lower part

The valley in question is a typical horst and graben structure which owes its origins to shallow tectonic displacement and is part of a series of such wide, “U” shaped valleys. A cross section of the island of Malta reveals this. These valleys have a relatively flat bed with gentle sloping hill sides. The main rock type found within the Foresta 2000 site is upper coralline limestone. Outcroppings of clay strata reveal that much of the area is underlain by impervious strata and this gives rise to ephemeral freshwater springs along the Marfa ridge.

In prehistory, the gentle sloping hill sides have been systematically terraced with rubble walls to provide land for agriculture. Such heavy human intervention on the landscape has led to a serious decline in natural habitats and related species. In recent years the less productive areas have been abandoned. These areas have either degraded due to soil loss, or have developed into a steppe and maquis habitat. Most of these habitats suffer degradation due to mismanagement and other human oriented activity. A number of rare and endemic plants can be found here too. Invasive exotic plants are also present and these constitute a threat.

Scattered within the site are historical and cultural structures dating back to prehistory. Rubble walls are an essential part of the rural landscape as are the few corbelled huts on site. More recent

historical structures include the St. Agata's tower. This tower was built in 1649. It was constructed to guard the northern low lying cost of the island from possible Ottoman invasions. WWII pill boxes and anti aircraft search light and gun emplacements are also common.

Management Authority

The site is managed by a Management Committee composed of members representing three organisations: Birdlife Malta (an NGO dealing with bird protection and their habitats), Din l-Art Helwa (another NGO dealing with natural and cultural heritage) and the PARK Dept. of the Ministry for Rural Affairs and the Environment.

Legislative status

Bird Sanctuary (EPA-LN 41/03) IUCN Category IV; Special Area of Conservation - International Importance (DPA/EPA LN 257/03 & GN 223/05); Area of Ecological Importance (DPA GN 400/96); IUCN Category 1B.

PASEM PROCEDURES

All the PASEM procedures have been carried out as requested. The Stakeholder identification process was successfully concluded. The following questionnaires were conducted and the results were evaluated through the PASEM procedure:

1. PA manager questionnaire
   (Project Manager)
2. Stakeholder Rapid Appraisal Questionnaires were administered to several individuals including representatives of Local residents, Din l-Art Helwa (Heritage NGO), Birdlife Malta (Avifauna NGO), Mellieha Local Council, University of Malta, Site Manager

A pilot community survey has also been conducted and a report has been generated. The Stakeholder workshop was organised and a comprehensive list of stakeholders were invited to participate.

Fig. 3. The Stakeholders' workshop

Stakeholder Participation Conference - Foresta 2000 (F2K)

Venue: Mellieha Local Council premises 12th December 2007

List of participants:

University of Malta; PARKS (Ministry of Rural Affairs and the Environment); Din l-Art Helwa; Bird Life; MHRA; Site Manager; Local farmers; Mellieha Caravan Assoc: livestock breeder

Table 1. Main Social Values, Objectives and Threats in the area

Social Values and Objectives	Threats
The greenery of the PA provides a welcome element in the dry Maltese landscape	Fire (arson)
Tourist resource	Illegal Bird hunting and trapping
Recreational value for semi-permanent residents (caravans)	Security
Recreational value for hikers/campers	Lack of signage (including footpath access)
Educational value	Lack of interpretation
Scientific research	Hostile behaviour
Value of PA is not restricted to locals	Irresponsible camping (need control) – soil compaction due to unrestricted access to vehicles
The PA provides an ideal environment for family picnics and barbeques	Threat of fire spreading from barbeques and camp fires
Respect for the rural and ecological character of the local landscape	Illegal and unplanned constructions
Farmers' property and legal status are recognised by the rest of the community	Theft of farmer produce – often
	Lack of security regarding land tenure (applicable to farmers who lease land from the state as well as caravan site)
Need to control access to site	Vandalism of gates in area. Some have been stolen
	Littering

Two Identified Priorities and related indicators for Social Values:

1. Recreational value of PA
   a. Number of vehicles parked on site (survey conducted by warden on a weekly basis);
   b. Number of walkers on footpaths (determined by automated data loggers);
   c. Questionnaire survey regarding satisfaction with recreational utility of PA (conducted seasonally every four years).

2. Educational value of PA
   a. Number of student and school visits to site (daily records are available at Bird Sanctuary and Tower);
   b. Number of academic and other research publications related to the site (Cumulative record of such publications can be obtained from University and copies of such material can be deposited at the interpretation centre library);
   c. Number and type of educational support material disseminated at site (flyers, Multimedia material, etc.).

Table 2. Main Economic Values, Objectives and Threats in the area

Economic Values and Objectives	Threats
Agrotourism	Barriers to agrotourism exist – lack of incentives
Tourism – especially off-peak season	Hostile behaviour towards tourists
Farmers cooperatives to market local produce	Local produce is not marketed
Cottage industry based within the F2K project boundary	Need entrepreneurship and incentives to develop cottage industry
Safeguard existing high value agricultural land	Lack of Protection of high value arable land (especially irrigated land and horticulture – water needed to sustain such land)
Cultural tourism –	Need to realise the potential of local knowledge for interpretation of cultural heritage – knowledge is lost
Improvements in local agriculture	Service roads within the PA are in a disastrous state – inhibits visitors and farmer activity
The PA has the potential to attract a greater number of tourists – specially targeted niche markets like ornithologists	Widespread, indiscriminate, and illegal bird shooting must be controlled before tourist ornithologists are catered for. Problem is that the economic benefits of such tourism are only realised after politically painful measures are taken
Water	
The wetland can be regarded as a tourist attraction	

Two Identified Priorities and related indicators for Economic Values:

3. Value of PA as a tourist resource
   a. Number of tourists visiting site (daily records are available at Bird Sanctuary and St Agatha Tower but datasets need to be disaggregated to identify tourist component of visitors);
   b. Tourist satisfaction with PA as tourist amenity (analysis and evaluation of visitor comments based upon visitor book available at entry points. Analysis can be compiled annually);
   c. Occupancy rates for tourist accommodation establishments in the vicinity of the PA (such data is published by the National Office of Statistics).

4. Value of PA as a Brand for Farmers' Produce
   a. Number of product varieties of cottage-style produce sold by farmers located within and/or contiguous with the PA (This needs to be assessed through market surveys);
   b. Number of farmers within PA registered as Organic Producers (Organic produce is perceived as complimentary to the goals of the PA. Records of Organic Produce certification are maintained by the Organic Produce Section of the Rural Development Program);
   c. Amount of annual subsidies received by local farmers from the Rural Development Program awarded to environment focused measures. This includes measures targeted at rebuilding terrace-supporting rubble walls (Detailed records of such funds are maintained by the RDP).

Table 3. Main Environmental Values, Objectives and Threats in the area

Environmental Values and Objectives	Threats
Clean air	Arterial road abutting PA is contributing to air pollution and noise
PA may provide an opportunity for the utilisation of recycled water (irrigation of saplings) which is unlikely to be utilised by local farmers	Recycled water quality is a major issue since it may be very high in salinity – need to monitor quality
PA is now considerably cleaner – closure of dump at "Ic-Cumnija"	Litter, illegal dumping of waste (fly tipping)
The PA should serve as a medium by which environmental information is communicated to the public	Insufficient information regarding environmental initiatives in PA
	Vandalism
	Lack of enforcement
	Occasional sewage outfalls within PA area when pumps fail
Reforestation has provided a green image to the area – much needed in deforested Malta	Need to plant more trees in some locations but garigue habitat needs to be safeguarded from any misguided planting
PA provides for groundwater recharge	Hotel boreholes are major threat to farmers' water supply – serious depletion of groundwater
Ghadira Wetland is a rare and endangered habitat in Malta.	Rising salinity in groundwater – abstraction rates exceed safe-well yield. Situation exacerbated by hotel demand for water
The wetland is an important stop-off point for migrating avifauna	Lack of adequate enforcement regarding illegal hunting within PA and its immediate environs.
Terraces and their rubble wall armouring reduce soil erosion and promote groundwater recharge	Neglect and lack of maintenance of rubble walls lead to accelerated soil erosion
Soil erosion and clay slope stabilisation measures (mini check-dams) contribute to reduction in soil erosion within PA	Off-road activities in area contribute significantly to accelerated soil erosion – especially on clay slopes – prevent recolonisation of slopes by vegetation
PA policy of reforestation with indigenous species ensures restoration and protection of local flora and fauna	Stands of exotic species of flora still pose a threat to local flora – acacia is now self-propagating
Rubble walls and other rural structures are vital elements in the local landscape and need to be regarded as a valuable tourist product	Some rubble walls are in a state of decay while some irresponsible people dismantle walls in search of edible snails (escargot)
The PA provides forage for beneficial insects thus reducing need for indiscriminate use of crop protection insecticides	Indiscriminate crop spraying in arable areas impacts beneficial insects and other fauna
	Lack of adequate signage and misleading signage. Lack of adequate footpaths and interpretation facilities

Two Identified Priorities and related indicators for Environmental Values:

5. Value of PA as a Biodiversity resource
   a. Number/density of Indicator species which reveal relative health of ecosystem: avifauna (especially nesting songbirds), insects (especially butterflies), and flora. (Birdlife carry out regular monitoring of avifauna within the Protected Area. Occasional studies of insect distributions are also undertaken by students for research purposes. These can be coordinated in order to yield maximum information regarding PA. Incentives should be provided to facilitate such work);
   b. Number of endemic species within PA. Higher values for this indicator provide some indication regarding the priority of protection that needs to be accorded to the site (Malta enjoys a surprising degree of endemics and some of these are found within the site. On site surveys need to be carried out at regular intervals);
   c. Number of exotic species within PA. Exotic species of flora and fauna pose a threat to ecosystem integrity. Eucalyptus and Acacia species of trees and shrubs had been planted within the PA and in the immediate vicinity while misguided landscaping in tourist-related facilities may facilitate the spread of exotics. (This indicator is closely linked to the preceding one and the same survey can service both indicators).

6. Value of PA as an example of soil erosion control and groundwater recharge resource and utilisation of recycled water
   a. Soil erosion control monitoring. (This can be evaluated by employing sediment traps installed at strategic locations. In particular, the efficacy of micro-terraces constructed across gullies can also be assessed. Another related indicator is an assessment of the number of breaches in terrace rubble walls. This can be assessed after the month of March when the probability of intense rainfall is greatly diminished);
   b. Monitoring of irrigation groundwater quality and quantity (most farmers keep track of salinity levels of water utilised for irrigation. Well yields are also duly noted);
   c. Soil salinity levels at various locations in the PA. (At present, the threat of salinization is only applicable in the low lying area surrounding the wetland. This should be monitored annually during the dry season. However, the proposed utilisation of recycled water on the slopes of the PA demands that such monitoring should be extended upslope).

Table 4. Main Governance Values, Objectives and Theats in the area

Governance Values and Objectives	Threats
A sense of “ownership” of the PA by the local and wider community	Vandalism seems to be endemic to the PA. Hundreds of recently planted trees destroyed and rubble walls damaged
The caravan site within the PA needs greater security	Theft from unattended caravans and general vandalism are common occurrences
The PA vision needs to be clearly communicated to users and the general public	Illegal hunting must be addressed through adequate wardening of the PA. Several cases are reported each year of birds being killed in the Bird Sanctuary
Shared responsibility for the management of the PA	The Management Plan for the PA needs to be fin alised and stakeholders need to be consulted
Respect for the rural and ecological character of the local landscape	Illegal and unplanned constructions
Farmers’ property and legal status are recognised by the rest of the community	Theft of farmer produce. Such theft is widespread but the risk is greater in the PA since the flow of people in the area is greater
	Lack of security regarding land tenure (applicable to farmers who lease land from the state as well as caravan site)
Need to control access to site	Vandalism of gates in area. Some have been stolen
	Littering

Two Identified Priorities and related indicators for Governance Values:

7. The relative success of the PA as an example of best practice in environmental management
   a. Number of police reports concerning contraventions reported within the PA. This can include theft and vandalism cases affecting the caravan site. (Such reports are logged at the Mellieha Police Station and deposited at District Police Headquarters. The number of such reports can be classified and evaluated over a given time period);
   b. Level of public participation in tree planting exercises and other similar events. (Attendance at such events can be monitored and logged by the organisers of the activity. Such data can be relayed to the Management of the PA);
   c. Levels of satisfaction expressed by visitors/users of the PA. (This shall be elicited by the application of social surveys questionnaires and structured interviews carried out periodically).

8. Value of PA as an example of shared environmental responsibility
   a. Level of stakeholder participation in the management of the PA. (This can be evaluated through the composition of the management board, or similar organisations, that are responsible for the PA);
   b. Number of participatory meetings held over a five-year period. (This indicator refers to the number of meetings where the views of the general public not just the stakeholders are sought over particular issues);
   c. Number of national/international projects that involve the PA. (This indicator highlights inter/national interest in the site. One example of this is the INNOVA project which has identified Foresta 2000 as a case study area. Other projects can be simple student exchange programs involving even minor, focused research. The number of such projects, duly classified, over a given number of years can be easily compiled and evaluated by the PA management).

The stakeholder workshop - General Comments

- Most participants in the meeting were under the impression that we were asking them for suggestions regarding specific actions which needed to be tasked by the PA manager or "the authorities" in general. Values and threats were somewhat difficult to elicit despite repeated explanations of what we needed.
- A long, chequered history of public consultation/ participation in Malta ensured that several participants were rather unsure of what they needed to do. Most often the participants ended up complaining about specific issues rather than identifying values, threats, and indicators.
- Many farmers had difficulty in dissociating their own needs from the needs of the PA. They felt that these were interchangeable.
- The lowest response was in the identification of indicators. Most participants had little notion (if any) of what indicators were despite our repeated explanations. This is hardly surprising considering that their exposure to the concept was rather limited but we were expecting a greater degree of insight in this respect. It may be interesting to conduct an exercise where farmers are taught about the value of indicators over a longer period of time and their performance is subsequently evaluated.

Fig. 4. Stakeholder engaged in PASEMP exercise

CONCLUSIONS

The Protected Area (Foresta 2000) is at a critical phase since the Management Plan is currently under construction. The INNOVA experience provided useful support in this regard. The stakeholder identification process is a good example of this and the questionnaires and workshop yielded a useful set of values, objectives, and identified threats to the PA. The Community questionnaire revealed that such objectives and values closely coincided with those of the stakeholders.

A useful set of objectives and their relevant indicators resulted from the stakeholder workshop and this shall be utilised in drafting the management plan. The results of the workshop were sent to the participants to keep them informed about the outcomes and for their reactions. The net benefit of the workshop, however, is far more than mere consultation; stakeholders now firmly believe that they share a common sense of ownership and responsibility over the PA. This should foster a greater degree of trust in its management and ensure a greater degree of sustainability and security for the PA.

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THE CYPRIOT PILOT PROJECT: DIERONA, ARAKAPAS, KALO KHORIO, LIMASSOL DISTRICT

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The area is situated at the southern slope of the Troodos mountain range, the main volcanic mountain to which the island of Cyprus owes its very existence (Pavlides, 1991), and belongs to the district of Lemessos. It is situated at a height of 400-650 m above sea level. The building zone of the three villages, Dierona, Arakapas and Kalo Khorio, occupies an area of about 30 hectares and the agricultural zone is about 200 hectares. The rest is natural vegetation which is disrupted by three man-made water reservoirs of total capacity 250,000 m^3. The total population of the three villages is 1112. The main activities of the inhabitants are: agriculture, construction activities and other technical services, government employees, and light touristic industry (a few cafeterias and restaurants). The area has an important cultural heritage which is evident by several old churches, some of which have been built before 1500. Such are the churches dedicated to the Holy Cross, Archangelos Michael, Ayios Yeoryios. Ayia Marina, Ayia Paraskevi, Theotokos and others. The most known of these churches is a small church in Arakapas dedicated to “Panayia Iamatiki” which may be translated as “Santa Maria Healing” based on an old and miraculous icon of Santa Maria (Pavlides, 1985). This church celebrates on the 8th of September, Birthday of Santa Maria, and annually on this day people from all over the island, and sometimes even local immigrants from overseas, often as far as Australia, gather for the Festival. All sorts of artifacts, local and imported, and agricultural products are sold in the square of the village outside the church near the confluence of two streams.

Fig. 1. A panoramic view of Arakapas area

The local fauna includes several bird species, the most popular for hunting being the fowl *Alectoris chukar*. Several snake species are also living in the area, among which the poisonous *Macrovipera lebetina* and the black snakes *Columber jugularis* and *Columber cypriensis*, both popular among farmers, as they constitute the best biological control for rats.

Average annual rainfall is 550 mm and minimum/maximum air temperatures are 3.6/12.1 in January and 20.3/32.5 in August (Meteorological Service, 2002). Citrus is one of the main agricultural

crops of the area, particularly mandarins. Arakapas village gave its name to the main local mandarin of Cyprus, which is aromatic, tasty, good-textured and fairly large size, most probably a selection of the Willowleaf mandarin (Kapari-Isaia, 2006). Olives is another important cultivation for production of both table olives and olive oil. Different fruit trees, including apples, almonds, peaches, nectarines, cherries and walnuts on the higher areas, are also cultivated. In the last three or four years greenhouse tomatoes and cucumbers are becoming important for the area, as citrus cultivation is declining as a result of low market prices. Grapevines on some higher slopes are used for wine making. Good quality honey is also produced in the area. Light touristic industry consists of a few restaurants and winter time safari.

The natural vegetation of the area consists of pines (*Pinus brutia*), wild olive trees (*Olea europaea*), carob trees (*Ceratonia siliqua*), shrubs of *Pistacia lentiscus*, *Arbutus andrachne* and *Quercus alnifolia*. *Rhamnus oleoides* and *Quercus infectoria* are also present. In early spring hills become yellow and a strong scent is in the air from the flowers of the leguminous plants of *Calycotome villosa* and *Genista sphacellata* on the hill sides. *Astragalus lusitanicus* also decorates the sides of the hills with its white scented flowers in early spring. In April *Lavandula stoechas* colours some hill sides purple and leaves a sweet fragnance in the air, while a little later *Cistus salvifolius* and *Cistus creticus* in their white and pink flowers, respectively, offer a simple but special beauty to the area. *Myrtus communis*, which is used for Epitaphios of Christ on Holy Friday, *Arabis purpurea*, known in the local language as “dakrya tis Panayias” (= tears of Santa Maria), *Capparis spinosa*, from which young shoots are traditionally collected and pickled and used in tavernas as delicatessen, *Poterium spinosum*, earlier used for making brooms, are also frequent in the area. *Helichrysum conglobatum*, *Phagnalon graecum*, *Helianthemum obtusifolium*, *Fumana thymifolia*, *Thymus integer* and *Lamium amplexicaul*e also grow on the hill sides among shrubs. A few trees of *Crataegus azarolus* offer their sweet and sour fruits in October-November for a special local marmalade (Mosphilo). *Scilla maritima*, *Asphodeline liburnica* and *Asphodelus* spp which inspired Greek poets, exhibit their white and purple flowers in spring and summer.

Fig. 2. An example of water reservoir

MANAGEMENT

The management of the above described area rests mainly with the District Office of Lemessos, the second largest city of Cyprus, situated at the southern coast of the island. However, there is no special budget for the maintenance of the area, except a small budget allocated annually to each village and managed by the local or community authorities. Each village is managed by a president and council elected every five years. The three villages share a regional elementary school which is situated in Arakapas. Presently efforts are being made for the establishment of a regional sewage water purification system. Irrigation water is also managed by an elected board in each community. The District Offices are under the Ministry of Interior Affairs. The government land, which is covered

with wild vegetation, is under the jurisdiction of the Forestry Department, except for the area covered by the water reservoirs which are under the jurisdiction of the Water Development Department. Both of the above Departments belong to the Ministry of Agriculture, Natural Resources and Environment.

VALUES, THREATS, OBJECTIVES AND SUSTAINABILITY INDICATORS

During 2007 an engineer from the managing authority, several stakeholders and members of the area communities were interviewed with regard to values, threats and objectives of their area. All stakeholders were persons who were born and lived in the area all their life, and they were all actively involved in area affairs. Household size appeared small, not exceeding the size of four members and education level fairly good with about 50% of people with upper secondary education. Average income per family was 1500 to 2000 Euros.

Fig. 3. Historical, cultural and religious heritage

VALUES

There was a general agreement with regard to the values of the area, which consist mainly of water reservoirs of total capacity 250,000 m^3, great biodiversity, particularly plant diversity, agricultural products of economical importance, historical, religious and cultural values, contribution to clean air and mitigation of pollution and climatic change.

THREATS

One of the major threats, which was stressed by all stakeholders and Community members, was the transport and road system, as there is lack of mass transportation means to the city, except for buses which carry once a day the students to the city of Lemessos for attending Gymnasium (Secondary Lower education) and Lyceum (Upper secondary) schools. However, the managing authority noted that the largest budget spent for the area concerns the maintenance of the road system.

Another serious threat is the continuing water scarcity. In addition to above ground water reservoirs, which receive water only during the rainy season, if annual precipitation happens to be adequate, there has been ground water in the area which has been heavily exploited by drilling and using water well petrol pumps for irrigating farmlands. This threat is so serious, that mid-January of 2008 in Arakapas was marked by an extremely tragic incident which sealed also the end of the present programme, as during the elections for the new Water Board members of the above community, two persons were shot, one dead (Vassos Kharalambous), being one of our stakeholders and our main connection with the whole area.

A third threat stressed by both the managing authority and the stakeholders is the fire hazard, which is increasing lately with increasing dryness. The area has been burnt twice during the last

seven years, the last fire being in late July 2007 and which destroyed about 2.5 square kilometers of wild vegetation and agricultural plantings. The nearest fire engine station is in Kakomali, a village 5 km away from Kalo Khorio, but the main fire engine station with adequate forces is in the city of Lemessos, about an hour drive from Arakapas.

Another threat is the land degradation as a result of intensive agriculture in some areas, particularly the area where greenhouse crops are cultivated, in combination with the use of pesticides: fungicides, insecticides, herbicides, and nitrogenous and other fertilizers. Land fragmentation, as a result of property transfer from parents to children, was also noted as a threat by a stakeholder.

Increase of waste and lack of organized dry and water waste management was also noted as a threat for the area which will be increasing if drastic measures are not soon taken.

Lack of adequate job opportunities, but also shortness in disposition of agricultural products produced in the area is an additional threat.

Hunting is finally another threat, as the area is popular for hunters from the whole island, and in Cyprus there are about 50 000 legal hunters, probably more than the birds living on the island, and there is allowance for hunting twice a week, Sunday and Wednesday between November first and end of March. Hunters, besides the dirt they leave behind, cause damage to agricultural crops, their dogs kill the foxes which are one of the main natural enemies of rats, and not infrequently may endanger the lives of farmers who work in their properties.

Additional social problems noted by Community members were lack of adequate medical care and old people´s care, lack of secondary education schools and the need for organized recreation for young people.

A general request from all stakeholders with regard to the Management authority, is the provision of transparent and detailed information on all actions, policies and measures proposed or taken by the authorities.

OBJECTIVES

The objectives which stakeholders and Community members consider as important for the area are:

1. To provide a safe environment for inhabitants to work and live in, including the improvement of road transport system and the establishment of efficient mass transportation means for easy access to the city. This will contribute to upgrading of young people's education and access to medical care for the elderly and the needy. Job opportunities in the city will be also enhanced in this way.
2. To promote local economy and particularly opportunities for disposition of agricultural products produced in the area. People of the area are traditionally hard working and manage to produce several agricultural products, but often they cannot sell them or they sell them in prices which are not adequate even for covering their production cost. This happens lately with the mandarins and other fruits, as with accession of Cyprus to the European Union and the trade liberalization with the GATT agreement, the local market has been flooded with agricultural products from all over the world and locally produced crops are sold with difficulty. The high labour cost and high production cost of the island cause inequality in relation to international trade prices.
3. To provide appropriate recreation opportunities, particularly for young people. These days youngsters are trying to go to the main cities for night time recreation and this often results to fatal accidents on the road. Several people complained that young people, trying to make their own contemporary entertainment, cause distraction to the communities often by the noisy use of motorcycles, law violation etc.
4. To promote the local economy is a general objective on which all stakeholders and most community members agree, although about 60% of people of the area appear satisfied with the existing economical development.
5. To protect the physical function of the landscape is also a general request, as they all recognize the positive effect of nature on their lives.
6. Waste management and establishment of a regional sewage system is considered important.

BEST MANAGEMENT PRACTICE

The present study and the receipt of information, exchange of views and ideas between the Managing Authority, Stakeholders and Community members, as well as our own relation with the area of Arakapas - Dierona - Kalo Khorio through the present programme and previously the connections acquired with growers of citrus during surveys for citrus viruses, have led to several conclusions with regard to a good management of the area.

The Management Authority in close cooperation with the local authorities and the stakeholders of the area should aim at the following practices and/or measures:

1. Find the best effective way for establishing frequent public transport lines between the three villages and the three big cities of the island, Lefcosia in the centre, Lemessos and Larnaca at the southern coast. This may be accomplished through special European programmes for the development of the country side. The existing road system is fairly good and the roads are well maintained, but all stakeholders and Community members complained about the transport system, as it is difficult for every family and/or person to buy and use their own private car for transfer to any of the three above cities. Mass transport means will facilitate the transport of everybody, including children and old people. Thus education and medical care facilities will be enhanced. Disposition of some local village products will be also facilitated. Furthermore, such a system would contribute to the decrease of energy transport and reduction of pollution caused by release of fuels in the atmosphere. The Managing Authority may look into the model of transport system in Greece, where fairly frequent bus lines are connecting nearly every village with the cities.
2. Establish a Fire Engine Station inside the area which should be active at least during the 7-8 dry months and create a sufficient number of fire watch sites (= pyrophylakia), both being handled by local people. The fire can be controlled effectively only when it is noted and taken care off the first minutes before starting spreading. And then these works will provide opportunities for permanent or partial employment of local people.
3. Establish regional dry waste management and sewage purification plans for effective management of all wastes.
4. Establish a regional medical care unit for providing basic care to elderly and small children and possibly first aids for mild emergency problems. An ambulance, however, might be possibly available for serious emergency cases which need to be addressed to major hospitals.
5. Establish a regional public non-profit old people´s home, so that old people, who cannot look after themselves and their children cannot care for them, may be well looked after at reasonable prices. This home can be established in the same way as several community homes have been created in the cities and it will comprise another opportunity for local people, particularly women, to work permanently or part-time.
6. Examine the possibility for the establishment of a regional Gymnasium (Secondary lower education) for the needs of the inhabitants. This will encourage young couples to stay in the area and not leave to the main cities for the educational future of their children.
7. To protect ground and surface water from pesticides and nitrates, an organized effort should be made by farmers to abandon the conventional agricultural system with frequent use of chemicals and turn towards more environmentally friendly systems, as the system of Integrated Crop Management (ICM) and/or Biological or Organic Agriculture. An additional advantage of these systems will be to increase the demand for the products of the area, as these days the European Market can accept mainly agricultural products produced by the above systems.
8. With regard to recreation of young people, Youth Centers may be established for sports and other activities, but such centers should be placed under the strict attendance and supervision of local responsible and caring adults.

The problem of **water deficiency** is a serious issue and not easy to be presently solved. However, measures should be taken for controlling first the use of ground water by restricting drilling and by setting strict quota with regard to the water drawn weekly or monthly. In addition, limitations should be set with regard to the area covered by intensive agriculture crops. The country side survived for centuries on the island, but traditional agricultural practices were very different from modern practices. Some agricultural crops, as grapevines and almond trees, were grown without irrigation and fruit trees which require irrigation were mainly cultivated in the stream beds. Ground water could not be consumed at the extent it is used today, as drilling machines and water well pumps were used here

extensively only after the 1960´s. It has been estimated that in the last 50 years Cypriots have consumed more water than during the previous 7000 years during which the island has been inhabited. Therefore, the general policy with regard to water consumption should be reconsidered and revised by the Ministry of Agriculture of the island, as one of the main natural resources of Cyprus is dangerously diminishing. There should be a general reconsideration of the development of the island.

With regard to the particular area under study, if measures are finally taken for the rational control of water use, people should be employed by the managing authority for overviewing application of the regulations. The same people may be also in charge of guarding the forest for illegal waste disposal, illegal fire making during the dry months and illegal hunting in restricted areas. In addition, the presently restricted to hunting areas are insufficient and application should be made to the relevant authority for extension of the restricted for hunting areas.

If all above described actions and measures are taken, then the Communities will have a good quality life, the physical environment will be maintained and the Natural Resources Degradation will be effectively controlled.

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THE GREEK PILOT PROJECT: LEFKA ORI NATIONAL PARK, CRETE

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INTRODUCTION: THE LEFKA ORI PROTECTED AREA

The INNOVA Pilot Protected area of Lefka Ori consists of a massif situated in the Western part of Crete (35_18Ά N, 24_02Ά E). In Lefka Ori, 38,500 ha are above 1000 m and 15 are peaks above 2200m, the highest of which is Pachnes at 2453 m. The massif is the wettest place on the island with 1900 - 2000 mm mean annual precipitation (Grove *et al*, 1993) and is made up of rugged marble and dolomite rich in rock debris and karstic formations (Vogiatzakis and Griffiths, 2001).

The number of endemic species present in Lefka Ori is very high. The 26.6% of the plant species over 1500 m are endemic to the island, while 10% is single Endemic Mountain. Moreover, 17 of the 263 taxa present in the Red Book for threatened rare plant species of Greece occur in Lefka Ori (Vogiatzakis *et al,.* 2003). The main human impact on the area is grazing which is increasing due to the changes in land use in the lowland and the introduction of EU subsides for the improvement of rangeland infrastructures, such as road networks and cisterns (Papanastasis and Kazaklis, 1998).

Samaria gorge in Lefka Ori (Fig. 1) was designated as National Park in 1962; other designations of the area are: Type “A” European Diploma in 1979, UNESCO MAB Reserve (1981) and Special Natural Beauty Landscape and Wild Life refuge (Fig. 2). Moreover, it has been designated as an Important Bird Area (IBA) due to the presence of Gypaetus Barbatus, which consists of 4 breeding pairs and 28 individuals that constitute the last breeding populations of the whole Balkan region (Xirouchais *et al,.* 2001, 2002), making Lefka Ori a vital site for the survival of this species. More recently in Lefka Ori two Natura 2000 sites (GR4340014 & GR4340008) have been established. The boundaries of the National Park have been expanded in 1999 from the initial 48.500 ha (Fig. 2, red line) to approximately to 305.275 ha (blue and yellow line).

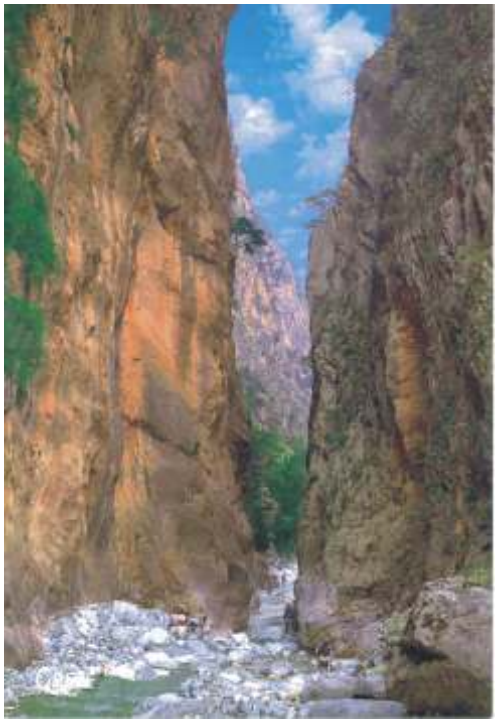
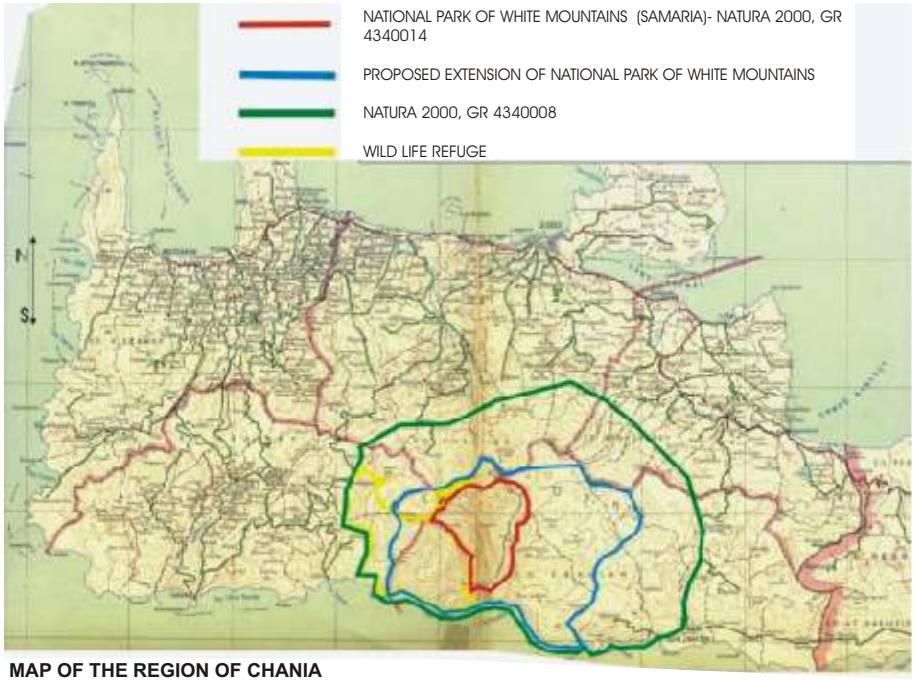


Fig. 1. Samaria Gorge, the Iron Gates [1]

The above characteristics and multiple protected area designations, including the fact that at the period of the INNOVA project, a revision of the existing management plan was in the process of being undertaken which the INNOVA results could inform, led to the selection of this site as a suitable pilot area project. Despite the legal establishment of a PA Management Authority in 1999, the management is still with the Forest Directorate of Chania until the Lefka Ori Management Authority is officially in operation. Nevertheless, both of PA MA and Forest Directorate were involved throughout the INNOVA pilot project process.



MAP OF THE REGION OF CHANIA
(INDICATING THE PROTECTED AREAS AROUND THE NATIONAL PARK OF WHITE MOUNTAINS-SAMARIA

Fig. 2. Map illustrating boundaries of Lefka Ori designations

INNOVA PILOT PROJECT ACTIVITIES

A range of activities was undertaken for Lefka Ori within the frame of INNOVA project which aimed at achieving the following outcomes:

a) Evaluation of protected area management effectiveness
b) Introduction of the concept of sustainability in protected area management
c) Development of a sustainability monitoring strategy for Lefka Ori
d) Increase of stakeholder and public awareness, regarding the protected areas threats and values
e) Enable stakeholder and local community engagement in protected area management

The activities carried out to achieve the above, consisted of the following:

- Meeting and interview with Lefka Ori Managing Authority and forest directorate to conduct management effectiveness evaluation.
- A stakeholder analysis followed by 22 stakeholder interviews establishing Protected Area, values, threats and sustainability objectives as well as an evaluation of management and participation issues.
- A structured survey of 219 households within the Natura 2000 protected area boundaries
- A tourism satisfaction survey of Samaria Gorge (400 questionnaires).
- Translation of results in Greek and extensive publication and dissemination, through reports, the local press and media.
- A one day stakeholder workshop consisting of 26 participants, through which a sustainability monitoring strategy was developed.
- Description of Management Practice “Measures to mitigate against rock fall hazard along visitors trail”.
- Establishment of baseline to inform monitoring strategy.

RESULTS OF PILOT PROJECT WORKSHOP

As can be ascertained from the above the Lefka Ori Pilot study generated a series of important results, (See INNOVA Pilot study report deliverable for full description of results and outcomes). Presented below are the results of the one day stakeholder workshop carried out in July 2007 at MAICh. At the workshop a total of 26 stakeholders participated including, representatives of government bodies, decision makers, civil servants such as the fire service, forest directorate as well as representatives of the business and tourism sector and academics with specialist background on the protected area. The local community was represented by its locally elected representatives. The workshop consisted of three sessions whereby the following activities where undertaken.

a) Establishment of Lefka Ori values and threats
b) Sustainability priority objectives that the management should focus on achieving
c) Identification and development of indicators, to determine whether these objectives are being met.

The workshop exercise followed the PASEM procedure, promoting high interaction and deliberation between stakeholders. Facilitation props where used, such as post its, sticky dots etc and a combined carousel, metaplan and Nominal Group technique was applied to all sessions (See PASEMP guidelines for further information). The aims of the workshop where achieved and participants engaged in all exercises with interest (Fig. 3).

Fig. 3. Picture of Lefka Ori workshop participants engaged in sustainability objectives determination exercise

In summary, the following environmental, social, economic and governance objectives where identified as being priority for the specific protected area and for which, a number of indicators were developed to be included in a future monitoring strategy (Box 1).

Lefka Ori Sustainability Objectives:

S1. To provide Education opportunities
S2. To maintain and restore cultural and heritage values

E1. To protect biodiversity
E2. To protect the physical function of the landscape

Ec1. To support local income generation diversity
Ec2. To provide effective infrastructure to meet PA needs

G1. To ensure the development and effective implementation of PA management plans.
G2. To promote public participation in Protected Area management and decision making.

Box 1. Lefka Ori sustainability indicators

The Lefka Ori priority Sustainability Indicators

S1. Educational level of PA population- % of population which has completed lower secondary education.
S2. The % of residents who perceive that in their area in the last 3 years the following have improved or remained the same:
a) activities for teenagers;
b) cultural facilities (for example, cinemas, museums);
c) facilities for young children;
d) sport and leisure facilities; and
e) parks and open spaces.
f) education facilities (eg information centers)
g) Primary health care provision
S3. Demographic changes (to identify internal migration flows through national census data) alternatively recording; number of children registered in PA local schools

E1. Population and spatial distribution of protected species
E2. Land use/cover changes mapping
E3. Grazing pressure in relation to primary productivity of the land

Gov1. The number of administrative acts undertaken per annum by the management or any other authority involved with the protected area
Gov2. The number of new legal regulations and policies developed per annum by the management or any other authority involved with the protected area.
Gov3. The number of legal breaches prosecuted per annum and number of projects undertaken for PA policy relevant implementation

Ec1. Census of economic activities (enterprises and self-employed) in the PA
Ec2. The economic-financial and trade flows (inflows and outflows) of the local economy in terms of gross production value.
Ec3. Family or household gross (or net) income by source

CONCLUSIONS

Although only a short period of time has passed since the finalisation of activities and dissemination of the Lefka Ori Pilot case study results, a number of conclusions can be drawn regarding the value and the impact of the process. Feedback from involved researchers, stakeholders and the Managing Authority has been positive, stating a number of added benefits. In particular, the value of the door to door community survey has been underlined, as it appeared to be the first time the public had been consulted regarding the protected area. The benefits from this activity were twofold; on the one hand the opinion, views and concerns of the local population where obtained and communicated to the relevant stakeholders and decision makers, and on the other hand, awareness regarding the protected area status was raised. What became obvious during the survey was that the majority of respondents were unaware of the fact that they were living in a NATURA 2000 site. This issue was discussed in depth with stakeholders at the workshop, who collectively decided that greater effort should be made to involve the public in the future, a laudable outcome in itself.

In addition to the tangible results, like the definition of sustainability objectives and indicators, an added benefit was the raised awareness regarding the issue of sustainability, as well as the importance of monitoring. The workshop in particular was seen, as described by the participants, as being of educational value, enlightening as well as a positive opportunity to deliberate with stakeholders with different capacities and backgrounds, thus allowing them to have a more holistic view of the issues regarding the management of this important protected area.

One of the limitations of this process, as pointed out by the Managing Authority, was the lack of official status of the PASEM procedure, which poses a barrier in its institutional utilisation. Based on the above, it can be concluded that the INNOVA project with the development of the PASEM

procedure and its activities in the Lefka Ori protected area, has been beneficial. Now what remains is the powers that be, to make the necessary steps in formalising this process and including it within existing governance and institutional protected area management procedures.

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THE EGYPTIAN PILOT PROJECT: OMAYED BIOSPHERE RESERVE

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DESCRIPTION OF EL OMAYED DESIGNATION

In 1981 Omayed was designed as a Reserve of Biosphere within the global network of the UNESCO/MAB programme. Prior to its designation as a MAB/UNESCO site, the area was the location for extensive integrated and interdisciplinary international research with the co-operation of many Egyptian Universities and Institutes. In 1986, the site was declared as a Protectorate by the Prime Ministerial Decree n° 671 Law 102 of 1983 concerning protected areas; in 1996 by the decree 3276 its boundaries were modified. The main reason for its designation is the high variability in habitats and consequently in natural resources of the area. Indeed Omayed seems to be one of the most productive desert areas in Western Egypt.

Physical characteristics

Omayed protectorate lies between latitudes 30° 38' and 30° 52' N, and between longitude 29° 00' and 29° 18' E. it is located at about 70 km to the west of Alexandria and about 200 km to the east of Matrouh. The protectorate covers an area of about 705 km². Its average width (North to South) is 23.5 km and its average length is 30 km (East to west). Its climate can be defined as sub-desert warm climate.

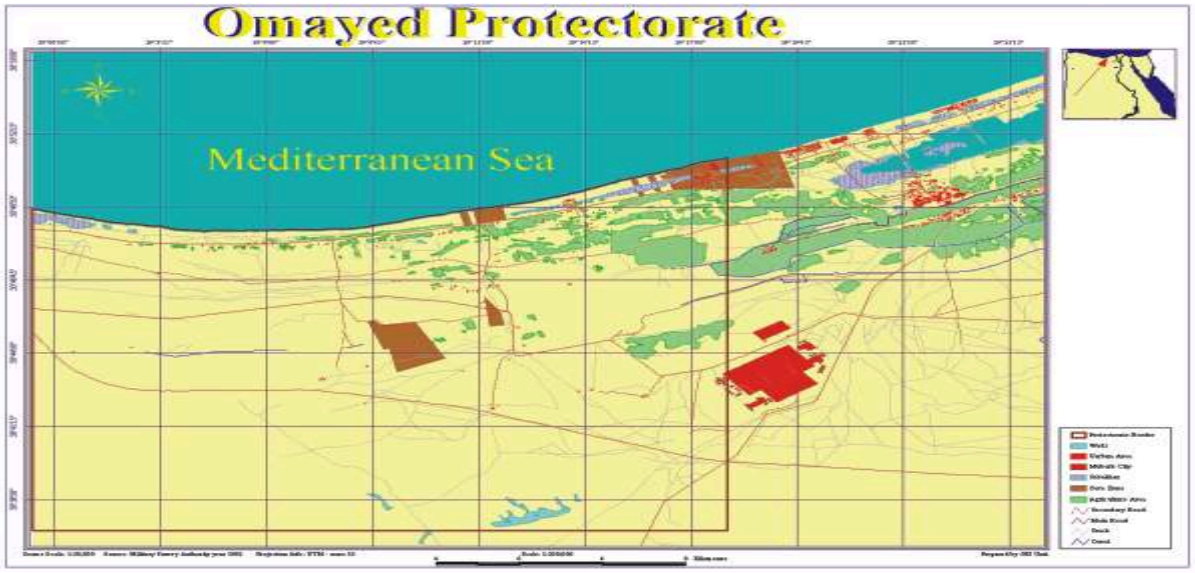

Fig. 1. Omayed Protectorate

Omayed Biosphere Reserve is characterized by five main habitats:

- Coastal Calcareous dunes,
- Inland ridges with skeletal shallow soils,
- Saline marshy depression,
- Non-saline depression,
- Inland plateau.

From a biodiversity point of view, the most important habitats are those of Khasm El-Eish ridge and its transitional area with the non-saline depression. This area hosts a high number of annual plants species. Moreover, the depression is rich in mammal species, rare insects and endangered molluscs. Around 170 plant species exist in the protectorate, 70 of which are medicinal plants, and 40 are of environmental importance. The area is habitat of a total number of 217 species, 3 of which are endemic and 14 of which are threatened. Wells and rainfall are the available water resources.

Local communities and cultural heritage

Local communities of Omayed Protected area are sedentary nomadic Bedouins who depend on rainfed cultivations, quarrying and grazing. The Mariut Coast has been settled since Mesolithic times by several populations: Tehenu (ancient dwellers of the coast), Greeks, Romans (during this period the area suffered from two brief but destructive Persian invasions), Byzantines, Berbers, Arabs and modern Egyptians. During the early Neolithic the area possibly served as a corridor for domesticated sheep and goats from Palestine to the Atlas Mountains, although no material evidence exists to prove it. During the Arab conquest (7th century A.D.) the population was gradually arabized and the local crops as vineyards were replaced by grazing. The transformation was completely achieved by the 10th century with the sweeping passage of the Beni Helal and Beni Suleim tribes driven away from Egypt by the Fatimids. Under the Mamelukes, after 1251 A.D., Arab tribes began settling along this coast, fighting each other and the original Berbers.

In Omayed there are about 12 Roman wells scattered all over the protectorate, and the historical Roman area in Marina.

Activities and services provided by the protectorate

The Visitor Centre of the Omayed protected area consists of a meeting room, a museum, a laboratory for data management, and sleeping rooms. This Visitor Centre receives about 20 visits of scientific expeditions, students' visits (from schools or universities), and non governamental organizations (NGOS) per year. The entrance of the protected area is first from Cairo, through the desert road of Cairo-Alexandria Road till the entrance of Wadi El Natroun Alamain road at the 102 km till reaching the entrance of the Protectorate 40 km before Alamain, the second from Alexandria, through Alexandria Matrouh Road till the entrance of the Protectorate at 81 km and then southward 8 km through El Geish Road till reaching the entrance of the Visitor Centre. There is no fee for entering the protected area.

INNOVA ACTIVITIES IN OMAYED

Within the INNOVA framework several activities have been carried out in Omayed Man and Biosphere Reserve. In order to investigate the sustainability of the management of the site several surveys were carried out with different actors of the protected area such as protected area managers, stakeholders and local communities. Once the surveys were concluded, a stakeholders' workshop for the selection of sustainability indicators took place. The results of the community survey as well as the indicators workshop are reported in the following.

The Local communities

During the survey with the local communities the respondents were asked to identify the main environmental, social, economic and governance problems of the area. The questionnaire was circulated to 210 persons. The main environmental problems identified by the communities were: garbage and solid and liquid waste in particular (87.6%), loss of biodiversity due to extinction of plants and animals (80%), overgrazing (68.1%), overhunting due to bird trade (23.8%) and bad water management (15.7%). Regarding the social problems, the communities identified the following main problems: demographic problems (internal migration to the Protected area) (89.5%), lack of adaptation of traditional knowledge and practices in the management of the protected area (69.5%), lack of information regarding ecosystem services and functions (57.1%), inadequate infrastructure network (31.4%) and inefficient road networks (21.4%). Whilst defining the economic problems the interviewed pointed out: the lack of labour productivity (52.4%), insufficient employment opportunities

(45.7%), lack of development opportunities related to the protected area (40.5%), and lack of support for new investment projects (31.4%). The communities identified the following problems related to the governance of the protected area: inexistence of gender consideration in PA management (100%), lack of environmental education (89.5%), inadequacy of the existing policies and laws for the effective management of the protected area (81.9%) and the insufficient financial support for the protected area management activities (70.5%).

Results of the stakeholders workshop

During the workshop for the selection of indicators the stakeholders, based on the results of the local communities survey, collectively identified the main threats to the protected area as well as the values and the sustainability sub-objectives.

Fig. 2. Stakeholders workshop

The participants of the workshop pointed out the following issues as the main environmental problems:

- The construction of secondary housing and tourist resorts along the north coast, and the subsequent building of roads.
- Uncontrolled bird hunting and the collection of rodents and reptiles for the wild animal trade.
- The digging of the New-Hammam water canal, 30 km of which run through the protectorate.
- Over-grazing and over-harvesting, due to the increasing Bedouin population.
- Over-harvesting of some wild and woody plants, for use as remedial medicines, herbs or fuel.
- Environmental pollution by pesticide and solid wastes.
- The introduction of species such as cats and dogs.

Many issues - namely, bird hunting, the collection of rodents and reptiles for the wild animal trade, and overgrazing - were also identified by local communities. Participants highlighted some major values and sustainability objectives to be considered in the management of Omayed Protected Area (Tables 1 and 2).

Table 1. Omayed Protected Area identified values

ENVIRONMENTAL VALUES	SOCIO-CULTURAL VALUES	ECONOMIC VALUES
The PA contains a relatively high number of rare, threatened, or endangered species.	The PA provides community development opportunities	The PA is an important source of employment for the local communities
The PA has a relatively high degree of endemism	The PA has high recreational value	The PA provides community development opportunities through sustainable resource use.

Table 2. Omayed Protected Area identified sustainability objectives

ENVIRONMENTAL VALUES	SOCIAL VALUES	ECONOMIC VALUES	GOVERNANCE
To protect biodiversity	To provide opportunities for physical and mental health improvement	To ensure that a minimum local population subsistence is achieved	To ensure the development and effective implementation of PA management plans
To protect the physical function of the landscape	To provide a safe environment for people to work and live in	To promote the local economy	To ensure the implementation of holistic risk assessment and environmental management processes (e.g. EIA, SEA, and EMS)

During the workshop, the participants also recommended several actions for improving the effectiveness of the management plan and achieve the aforementioned sustainability objectives. The following main actions were identified to be taken:

- Control of the capture and trade in birds of prey, and prevention of quail netting inside the reserve.
- Coordination with the Ministry of Agriculture and Land Reclamation regarding the New-Hammam canal.
- Provision of appropriate stoves in order to replace the use of woody & dried plants for heating & fuel.
- Provision of financial and technical supports for establishing a sanitary drainage system as an alternative for the current digging sewage system.
- Further studies of rare and endangered species should be conducted.
- Reintroduction of species and subspecies, which have disappeared or decreased in number in the area, when necessary.

Moreover, it was suggested to include long-term objectives in the management plan of Omayed Protected Area, such as: public awareness raising and participation in nature conservation, actions to improve the socio-economic opportunities for the local people. The need to maintain and enhance the ecological and landscape values of the site, where applicable, was also stressed. The participants agreed on the need to resolve existing conflicts - hunting and land ownership - to make current management more effective.

SESSION 2

SEMINAR ON PLANNING AND SUSTAINABLE MANAGEMENT OF COASTAL ZONES AND HIGH ENVIRONMENTAL VALUE AREAS

WELCOME GREETINGS FROM CIHEAM
MEDITERRANEAN AGRONOMIC INSTITUTE OF BARI, ITALY

It is my very great pleasure, as Director of the Mediterranean Agronomic Institute of Bari, to welcome you all for attending this meeting.

I would also like to thank the political and academic authorities and especially the Delegations of Italy, Cyprus, Malta, Greece, Turkey, Egypt and Palestine for accepting the invitation to participate in this Meeting, as well as for the work jointly performed under the aegis of INNOVA project over the last one and half years. Through such a valuable work, significant objectives like the elaboration of common guidelines for monitoring, planning and managing High Environmental Value Areas (HEVAs) were achieved.

I am grateful to *Regione Puglia* (Puglia Regional Authority) that has been leading this team of experts it contributed to set up.

In the presence of the Councillor for the Environment, the Councillor responsible for State Property, the Councillor for Public Works of *Regione Puglia* and the Secretary General of the Basin Authority of Puglia region, I will briefly take stock of the work done in the course of INNOVA project.

With my colleagues from the Countries represented in this room, we shared a working methodology that considered participatory approach and sustainability as the indispensable pillars for the management of High Environmental Value Areas.

Being guided by such principles, two Networks between the scientific and administrative institutions were established.

In the frame of the selected Pilot Areas, both the stakeholders and local communities were given the opportunity to express their views on the potentials offered by the Protected Areas and the threats to their survival, on the quality of management and its effects on the community's life.

An additional innovatory feature of the Project consisted in setting the management of High Environmental Value Areas in the wide frame of sustainability, arranging the different aspects of the management of natural, cultural and territorial resources with respect to the sustainability dimensions.

The sustainability framework has been the leading theme of the various steps of the project: from the identification of the general objectives to the definition and choice of the set of indicators, to the elaboration of common guidelines. We should not underestimate the importance of the latter: defining common and shared guidelines is not simple at all, since it means sharing the same scientific language, defining common objectives for the protection of natural and cultural resources.

Through a computer-based platform that can really support Protected Areas programming, we started gathering examples of good practices presently applied in Italy and in other countries, and accordingly shared them.

These results, though not final, spur us on to continue along this way that can involve all the Countries belonging to our intergovernmental organization. I am convinced that through this project and others to come for which we will work hand in hand with regional, national and international institutions, we will manage to finalize aspects of strategic importance for the future of our Mediterranean region.

Upon international congresses, much is debated on the impacts that climate change and the destructive action of men could have on the degradation of coastal areas, on the acceleration of desertification processes, on the irreversible reduction of biodiversity. From the news conveyed by the Conference of the United Nations of Bali we understand that even the big countries of the planet, the world's major polluters, are reformulating their development, and adopting more sustainable behaviours. Undoubtedly, this should make us more optimistic but also gives us some cause of concern in that it indicates that an increasingly critical perspective is looming. The Mediterranean region, already currently affected by severe resources degradation, will be even more so as a result of these big changes.

So many representatives of the scientific and institutional-governmental institutions assembled in this room are a reason to encourage us to work together, sharing all the opportunities that the know-how makes available to us and defining possible scenarios of an area as fragile as the Mediterranean. It is my firm belief that our endeavour will be for our benefit and for the future generations as well.

Cosimo LACIRIGNOLA
Director of the Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB), Italy

WELCOME GREETINGS FROM COUNCILLOR FOR ECOLOGY REGIONE PUGLIA

The European Commission directives on the environment are quite ahead of what local authorities or the Italian government manage to implement; this is not always the case (in agriculture, for instance, the way the European Union switches its action from the Mediterranean to the northern Europe agriculture is somehow questionable), but it is certainly so for environmental protection and occurs not only through the strict and faithful recognition of the application or non-observance of the rules, but also through studies, programming actions, drafting of guidelines and programmes that provide inputs that allow the "*Sistema Italia*" (Italian State system), in general, and *Regione Puglia* (Puglia Regional Authority) in particular, to regulate and model their own institutional, economic and social behaviours.

The *Regione Puglia* position on the integrated management of coasts and environmental resources therein is not univocal because: on one hand, the new regional government immediately realized that a Mediterranean vision was needed to address decade-old contradictions that could only be tackled through policies of a scope broader than regional and national - and the Department for the Mediterranean was set up for this purpose; on the other hand, it has not yet acquired enough strength and awareness to face the functioning dynamics of the regional machinery, of competences, of functions and responsibilities regarding the problem of water resources, of coasts, of state property - and fisheries as well, thus keeping this domain still fragmented, whereas other bodies and not only regional government departments (the Basin Authority for instance) - act and intervene in the fields of their competence.

This meeting of today and the one of May with Mediterre (as a second phase for further and conclusive insights) will undoubtedly lay the basis for our institution to reflect on the course of actions to be pursued, also to avoid risking that enhancement of territories and competences might result in narrow localism that is unsuitable to address world-scale processes.

I am referring, for instance, to the "struggle for the sand" between the Provinces of Brindisi and Lecce. It is evident that the ruling class has to be up to evaluating such phenomena at the regional, national and Mediterranean scale.

On the other hand, we should be aware that processes that have developed on the beauty of our seas, of our beaches and our coasts require special care that takes a partial toll on the enhancement of such beauties since the habitat and natural resources are an asset with an associated cost and not limitless in nature. With this in view, we feel bound to address to the military authorities when they accomplish their defence task and decide to intervene in the park of Otranto, at Punta Palascia, to increase military easement, since if we succeeded in wringing that portion of coast from a tourist development model that considers enhancement as the exaltation of what is available but disregards its consequences, we didn't do so for the landscape to take on a new and different burden.

We should be aware that when we decide to protect a portion of natural resources we do so having in mind an investment that concerns all of us and which is not motivated by ideological fancy; the establishment of a protected area, the observance of the ban to build away form the coastline or the Basin Authority plan, the groundwater reclamation, the ban to sell artichokes grown in the proximity of the power plant of Cerano and the reclamation of the petrochemical industry are not punitive measures against someone, but actions to preserve a region where the industrial model as well as the tourist and agricultural models have since long operated with the indulgence of the ruling classes and have neglected future forecasts.

Equally, erosion is not a localized phenomenon and we contributed to it, the same as we did to mucilage phenomena.

For these reasons, I insist on an environmental policy capable of giving sometimes a straight "no" in view of turning protection into a benefit for the community and changing it into "yes" for the future generations.

Michele Losappio
Councillor for Ecology
Regione Puglia, Italy

WELCOME GREETINGS FROM COUNCILLOR FOR PROPERTY MANAGEMENT REGIONE PUGLIA

This meeting is quite stimulating to take stock of the work that the regional government has been doing over the two and half last years. The concept of integration is increasingly prevailing, as it is imposed by the rapid and complex changes we are called to govern.

Regione Puglia (Puglia Regional Authority) is increasingly orienting its governance towards actions that take account of the changes and transformations occurring on the territory and it interacts with them trying to govern and guiding their course. And one of the most complex and rapidly evolving processes in our territory specifically concerns the coasts, one of our most valuable resources. The integration principle is closely connected to the need of making our policies effective: fragmentation is a principle that applies to a governing body which is not willing to influence the phenomena; whereas, the regional government is pursuing the objective of governing them and, thus, pooling and sharing various parts of public policies to achieve the same objectives is inevitable and unquestionable. Integration is the condition to make public policies effective.

It develops at two levels, namely:
1) the tools;
2) the integration facilities.

The former means establishing the supremacy of the programming and planning tools. So far, the "bureaucratic" principle has regulated the use of coasts in the history of our region and in most of Italian regions (also because of the legislative transfer of competences of the public maritime domain from the central government to the regions). A set of administrative mechanisms have governed the use of coasts; the access to coast management has been regulated by criteria and rules that have allowed the private individual to act on portions of the public maritime domain.

Only recently have we realized that this interface between land and sea, an interface having an intrinsically fragile equilibrium, harbours indeed processes so complex and delicate that adequate knowledge of the phenomena operating on this portion of territory has to be put before any procedural bureaucratic regulation.

For this purpose, a law was enforced to introduce the planning tool as a precondition to the use of the coast and it was a sort of "Copernican revolution" because rather than allowing the private individual to take action, it has asserted the superior interest of protecting such an extraordinary public asset. Such protection is achieved through planning: proper and detailed knowledge of the coast but also of the phenomena that take place on this physical interface. It has also defined a more legally binding framework of rules on the types of developments that can be accomplished on the coasts since, in the past, flexibility has been excessively loose even on the system of rules applied to these types of interventions.

The case of Apulia is highly emblematic: under the umbrella of the category of facilities that can be easily removed, there are, indeed, massive and in many cases irreversible forms of environmental rape and pillage that have disfigured our coast. Therefore, having reasserted a set of legally binding rules to rigorously characterize the models and the types of legislative interventions is a strong signal of discontinuity with the past.

We are close to submitting the regional Plan that will be a fundamental governance tool for the use of the coast in our region. It is not by chance that, at this point in time, the drafting of the Plan by the *Politecnico di Bari* is advancing arm in arm with all the regional landscape and territory planning tools. We are taking into account not only the whole environmental planning which is consolidating in our territory, but the landscape plan as well. An attempt is thus made to integrate all the pieces so as to have a perfectly consistent and feasible tool.

But we are still advancing in the implementation of possible intervention models that avoid repeating the devastating errors made also by public authorities not too far back. I am referring, for instance, to one of the elements that is coming out of the analysis of coast planning. The analysis has

disclosed the very close relationship between anthropization processes that have massively characterized our coast over the last 40 years and erosion that makes our region one of the most exposed in Italy. The important dynamics of anthropization of our coasts precisely characterizes the portions mostly vulnerable to erosion, those more at risk.

In many of these territorial domains, absolutely devastating intervention models have been applied, even through public financing that, on one hand have solved the problem of erosion in very small portions of the territory but, on the other hand, have generated opposite phenomena in neighbouring areas. We thus need to act by following a complex and holistic rather than a fragmented approach, and develop intervention models consistent with the new programming cycle that will make available the resources needed to re-balance the system of environmental threats to of our territory.

We have deployed a huge shared effort for integrating instruments and acquiring effective ones to govern the “coast” resource. In this sense, the Basin Authority is working to prepare feasibility studies and intervention models for an effective struggle against erosion.

A second equally important integration level refers to facilities.

Dealing with environment, we count the cost of the fragmentation of the administrative structures that makes the harmonious reorganization of activities complex and tiring. We have the problem of unifying a multiplicity of “pieces” of the public administration, that have been so far designed to be absolutely impervious to each other because the governing principle in the public administration activity was a formal principle rather than a principle of governance of phenomena. The portions of proceeding entrusted to my responsibility were formally correct and this exhausted my responsibilities without achieving the objectives.

Even in this sense, we are trying to make a sort of “Copernican revolution” focusing on effectiveness, results, and impacts of transformation processes. The Regional Executive will soon approve a significant change in the regional administrative structure by which we launch, for the domains of large-scale competences of the regional policies, five area directorates that shall integrate all the pieces of the administrative activity falling within the same big issue. One of them, in particular, will refer to the environment and we plan to integrate in it all the environment-related issues (also, for instance, the piece that now is part of the Department of State Property) but also all the urban planning policies. It shall be precisely called “environment and territory”; and this because it is inconceivable to speak of environment and keep it disconnected from the interaction with urban anthropogenic spaces. This area directorate shall also integrate all the issues related to the system of networks and infrastructures, as well as the issue of soil and territory conservation, with all the matter of interventions on hydrogeological instability. We shall have a single venue where the policies for consolidating the territorial system shall be worked out as a single resource available to us.

I conclude by referring to the image evoked by my colleague: we are getting out of a long phase that has consolidated a prevailing idea that we can use public heritage in general and the environmental assets in particular at will. I believe that the real turning point we are called upon is to introduce the idea that regulation is not a constraint, an impediment, but a condition for development. A prerequisite for development. An adequate, effective and shared system of rules consistent with changes, phenomena and dynamics is the real prerequisite for making the development of the territory sustainable and to leave a sustainable prospect for our territory. And I am convinced that this development can solely be driven by appealing to the beauty of our landscape, which is our true resource. And regulation is the only tool to use it without disfiguring it, to use it without destroying it.

Once we are really convinced that regulation is beneficial and more effective, the cultural revolution will probably be accomplished.

Guglielmo Minervini
Councillor for Property Management
Regione Puglia, Italy

WELCOME GREETINGS FROM SECRETARY OF THE BASIN AUTHORITY REGIONE PUGLIA

I convey my address on behalf of the Councillor of *Regione Puglia*, Mr Introna, who apologizes for not participating in this meeting due to his busy institutional schedule. I really thank him for inviting me to represent him in this meeting. I also thank the Councillors who spoke before me for their kind words on the activities of the Basin Authority I have the honour to serve as Secretary General. I take this opportunity to make a link between applied research and land management activities, this being the professional reason why, in my position of University professor of Hydraulic Engineering, I serve today as Secretary of the Basin Authority: probably because the Regional Executive recognized the local academy skills to be the driving force of knowledge but also of *in situ* applications, following a process that might operationally contribute to solving the problems Apulia region is currently facing. In such a scenario, matters as complex and multidisciplinary in nature as the environmental ones that involve multi-level experiences, evidently need to arrive at a quite valuable sea-coast interrelationship application example.

In this regard, I would like to mention an emblematic case: the Ofanto river mouth is constantly retreating as a result of both natural events started some time ago, and to the construction of high dams. This is a clear example of the humans' responsibility in the evolution of the sea-coast behaviour, since on that area they have constructed harbours but underestimated their effects on the transportation traffic along the coast, and have designed protection actions - some of which successful other less so. This resulted in a complex condition where erosion has coupled with deposition, both triggering urbanization processes sometimes developing in a wild manner, and so forth. All these elements need to be set in the framework of territory governance for which a unitary strategic vision is essential. In my view, this is theoretically and culturally easy to say but much more complex to be operationally achieved by the involved managers because the required professional and cultural skills are as many as the possible technical approaches; but, to mark our presence within the institutions we now need to show we are capable of gathering and accommodating the necessary multifaceted cultural implications.

Knowing that important programming sectors fall into the Department of Public Works of the Apulia Regional Authority (suffice it to mention the Water Resources Protection Plan, the Basin Authority activities in soil conservation against floods, as well as in water balance and the capacity to share the scarce available water resources with neighbouring regions), we have to pool our different competences and professional skills using our best endeavours to succeed.

As far as I am concerned, I serve a small and agile institution staffed by few people who share much enthusiasm because they are motivated despite job insecurity: with a mood of optimism I convey my opening address to this meeting and I am convinced that, in these days where knowledge is rapidly evolving, the speakers' contributions and debate will be the driving force for future actions.

Antonio Rosario Di Santo
General Secretary of Basin Authority
Regione Puglia, Italy

ENVIRONMENTAL ASPECTS OF RELICT SAND DREDGING FOR BEACH NOURISHMENT

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INTRODUCTION

Among the different coastal protection techniques, beach nourishment with relict sands is considered a useful method, often preferable to the permanent defence structures (seawalls, groynes, emerged breakwaters) (Boyd *et al*., 2005; Simonini *et al*., 2005). Nowadays, marine sand deposit exploitation is a very common technology both in Europe and in the rest of the world. In Italy, the first beach nourishment activities by means of relict sands took place in the '90s in Pellestrina and Cavallino (Venice, Italy, Adriatic sea) and, later, in Ostia (Rome, Italy, Tyrrhenian sea) (Cecconi and Ardone, 1999; Nonnis *et al*., 2002; Paganelli *et al*., 2005).

Relict sands are marine deposits that are no longer in equilibrium with the actual coastal sedimentary dynamics, and they are found offshore and at great depth. Relict sand deposits represent paleo-beaches, deposited when the Mediterranean sea level was lower than the recent one.

Because relict sand removal does not interfere with coastal dynamics, dredging great volumes of sediments does not compromise the beach's equilibrium. The employment of considerable volumes of sediments, together with the high biodiversity of the Mediterranean sea, determines that, for beach nourishment activities, particular attention must also be paid to marine environmental characteristics, as well as to the technical and economic aspects of the Project.

It is known that dredging activities involve physical and biological effects on marine environment. The physical effects are related to the substratum's alterations (bottom morphology and sediment granulometry) and to the resuspension of bottom sediments into the water column, with a consequent increase of suspended particulate matter (turbidity) (Newell *et al*., 1998; 2004; Nicoletti *et al*., 2006). The most relevant biological impacts involve the benthic community (especially in the presence of sensitive habitats) and the demersal fish assemblages, both closely associated to the sea bottom (de Groot, 1996; Hitchcock *et al*., 1999; van Dalfsen *et al*., 2000; Boyd *et al*., 2003; 2005; Simonini *et al*., 2005; Nicoletti *et al*., 2005; Marzialetti *et al*., 2006).

In this context, in the last decade ICRAM has been engaged in national and international research activities related to environmental monitoring studies on sand dredging for beach nourishment (Nonnis *et al*., 2002; Pulcini *et al*., 2002; Nicoletti *et al*., 2002; 2004; Paganelli *et al*., 2005). In fact, since 1999 ICRAM has carried out environmental monitoring studies both in the Central Tyrrhenian Sea and in the Adriatic sea, in order to evaluate the environmental compatibility of relict sand dredging for beach nourishment. On the basis of the experiences acquired, ICRAM has developed a specific monitoring protocol related to the environmental studies on relict sand dredging for beach nourishment activities (Beachmed, 2004; Nicoletti *et al*., 2006). Monitoring activities are an essential process in adaptive management (Wilhere, 2002), as they allow to ascertain whether the management actions - accurately planned and verified in exact periods - are compatible with the expected results and, therefore, if the management processes are proceeding correctly. Monitoring is therefore an essential instrument for integrated coastal management.

THE MONITORING PROTOCOL

In order to understand the structure of the environmental protocol (Fig. 1), it is important to underline that relict sand dredging for beach nourishment involves the performance of specific and distinct activities: dredging, sand transport and nourishment. These activities define three different spatial areas, in which each specific activity occurs: the continental shelf (dredging), the beach (nourishment), or both (transport). Because these three areas show different environmental characteristics and are affected by different types of activities, the effects related to the removal of bottom sediments can vary.

In the dredging area, the effects of sand extraction involve both the physical compartment (substratum and water column) and the biological one, with particular reference to the effects on benthonic assemblages with possible economic relapses on fisheries.

On the other hand, in the transport and nourishment areas, the most relevant effects due sand extraction activities affect the sensitive habitats (if present), both for the temporary increase of suspended sediments and for the re-deposition of new fine sediments.

The specific monitoring protocol for relict sand dredging and beach nourishment is articulated in two main sections: the environmental characterization study (before sand extraction and nourishment) aimed at evaluating whether or not these activities can be carried out with sustainable effects on the environment, and the monitoring study (during and after the activities), aiming at investigating the effects on marine environment up until the restoration of a new equilibrium conditions.

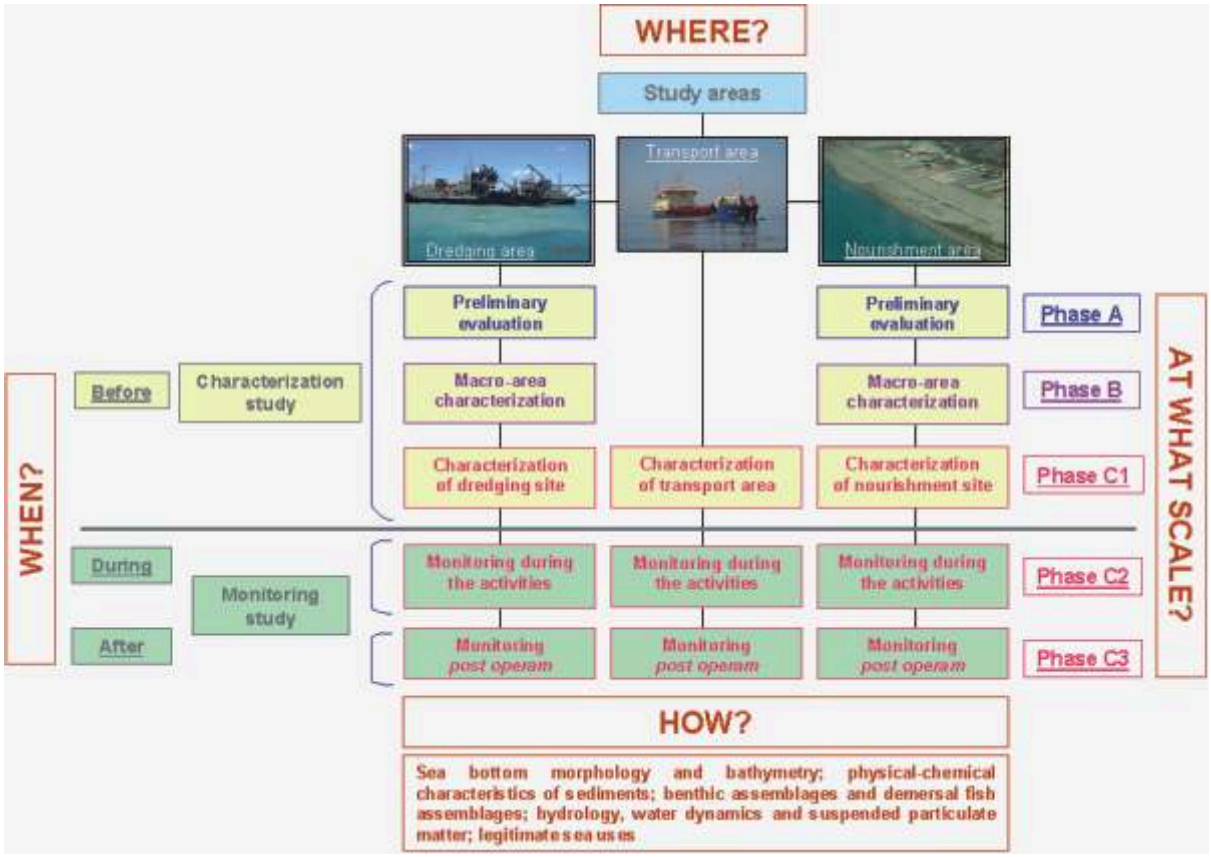

Fig. 1. The environmental monitoring protocol related to relict sand dredging for beach nourishment

The environmental parameters requiring monitoring are:

Morphology, bathymetry and physical-chemical characteristics of sediments - The study of sea bottom morphology and bathymetry allows us to define the general organization of the dredging and nourishment areas and to pinpoint the presence of rocky substrata and/or sensitive habitats. Through the physical analysis of superficial sediments it is possible to describe the sediments' granulometric characteristics, and to evaluate the quantity of fine sediments that may be put into suspension during dredging and nourishment activities. The sediments' chemical analysis (metals and organic contaminants) provides information about the quality of sediments to be removed.

Hydrology and water dynamics - The removal of sediments from the bottom has significant effects on water quality, due to the mobilization of large amounts of suspended materials. In order to evaluate the diffusion of suspended materials caused by these activities, it is important to keep in mind both the natural concentration of suspended materials, and the physical-chemical and dynamic

characteristics of the water column. Because the hydrology and water dynamics parameters depend on seasonal variations, the surveys carried out must include at least two extreme seasons, i.e. winter and summer.

Benthic assemblages - The study of benthic assemblages provides indications about the marine environment's general conditions. Due to these organisms' close contact with the sea bottom sediments and due to their limited mobility, benthic organisms are considered a useful indicator to study natural or anthropogenic environmental changes. Besides, by analyzing benthic assemblages and their variations due to sediments removal activity, it is possible to observe the recovery capacity of a specific area up until the restoration of a new equilibrium condition.

Demersal fish assemblages -The characterization of the demersal assemblages helps determine the presence of sensitive species and of some critical phases of their biological cycle. Due to their close contact with the bottom, demersal species are directly affected by potential environmental changes caused by these activities. Surveys on demersal assemblages must be carried out seasonally, in order to identify their nursery and reproduction areas.

Legitimate sea uses - In general, areas characterized by legitimate sea uses are not compatible with bottom sediment removal activity, which may constitute strong restrictions and influence operations. For this reason, it is necessary to mark the presence of marine protected areas (MAPs), national parks, underwater artificial reefs, mariculture installations, dumping areas for harbour-dredged materials, lines and pipes, offshore terminals, no anchoring and no fishing zones, and military sites. Besides, it is essential that the dredging area fall outside the 3-nautical-miles strip from the coastline or beyond the strip ranging from 0 to 50 meters in water depth, as this is a very sensitive zone from an environmental point of view.

The environmental characterization study

The environmental characterization study involves collection of data (biotic an abiotic parameters of the involved areas and legitimate sea uses), which will later be compared with data gathered in the subsequent monitoring study.

This study involves all the three areas (dredging, transport and nourishment) and is divided in three phases:

- Phase A - aims to provide a complete and detailed picture of the available knowledge, at a regional scale, related to the different parameters of the sea environment. It involves a wide area, including the dredging and nourishment areas and the surrounding ones, and it consists in the collection of the existing bibliographic data.
- Phase B - provides a more detailed picture of the environment and the filling in of possible bibliographic gaps emerged in Phase A. It involves the collection of experimental data by means of direct surveys, in order to characterize two large macro-areas, the dredging and nourishment areas. The dredging macro-area must be comprised between the relict sand deposits and the coastline.
- Phase C1 - involves the performance of experimental surveys, in order to characterize the areas that will be really dredged and nourished (and their surroundings areas). Results obtained in this phase will be useful to estimate the environmental compatibility of the planned activities.

The environmental monitoring study

The environmental monitoring study involves a series of surveys in all three areas, aimed at evaluating the effects of dredging and nourishment (monitoring during activities) and the medium-long term effects on the marine environment (monitoring after activities or *post operam*).

The direct investigations that must be carried out during dredging and nourishment operations (Phase C2) aim at evaluating whether the effects generated are tolerable and, therefore, if the activities can go on or whether, on the contrary, it is necessary to stop the operations to promptly plan measures of mitigation. The results obtained allow to verify the validity of the area identified in Phase C1, if necessary allowing its extension on the basis of the results of the monitoring study carried out during the activities.

In the following *post operam* monitoring study (Phase C3), the possible medium-long term effects of sand extraction and nourishment were analyzed in each area. The monitoring characteristics (such as the number of surveys and timing) will depend on the recovery capacity (i.e., the restoration of new equilibrium conditions) of the involved areas.

The flow charts related to the environmental studies that must be carried out in the dredging, transport and nourishment areas are illustrated in Fig. 2, 3, 4, respectively.

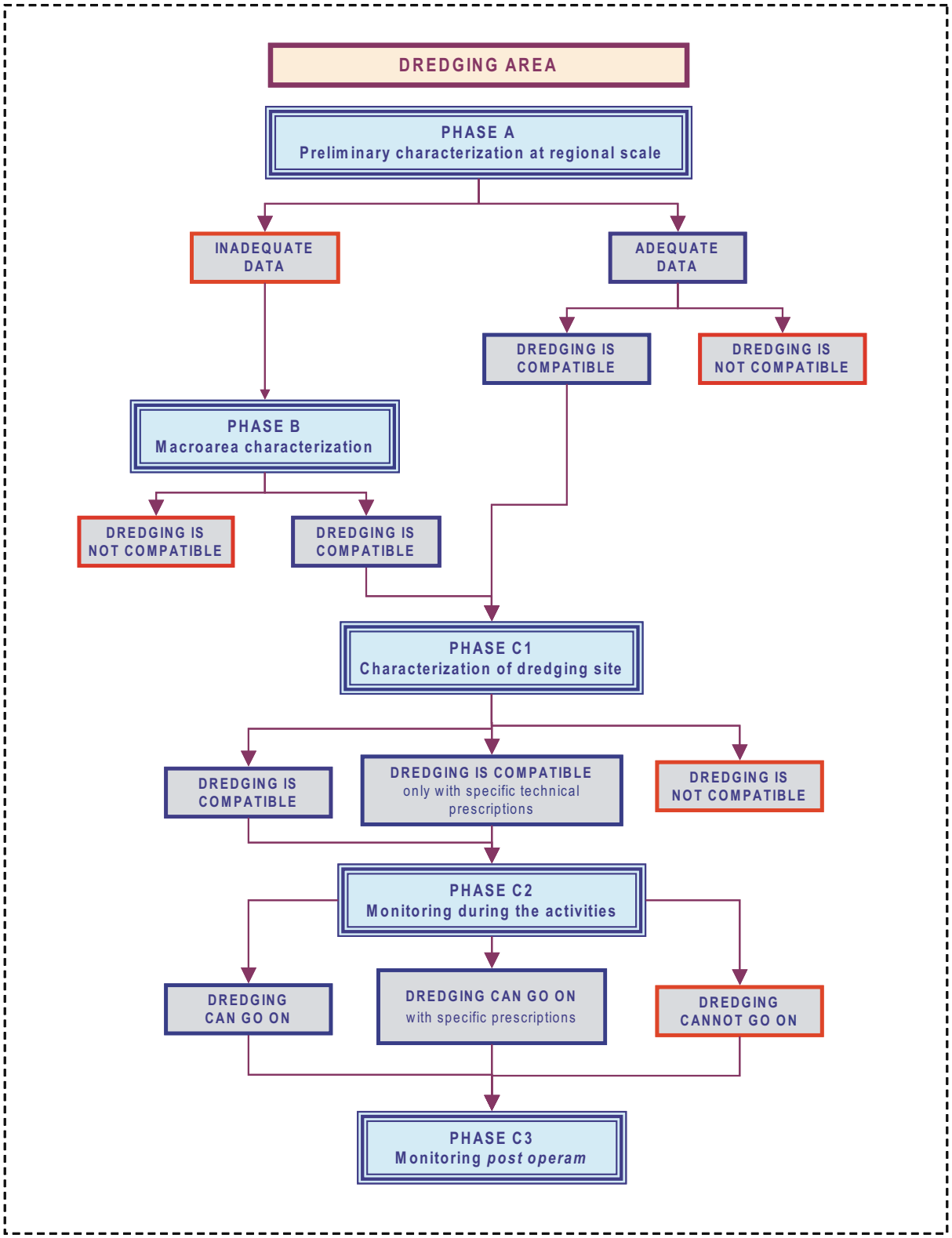

Fig. 2. The flow chart of the environmental monitoring protocol related to the dredging area

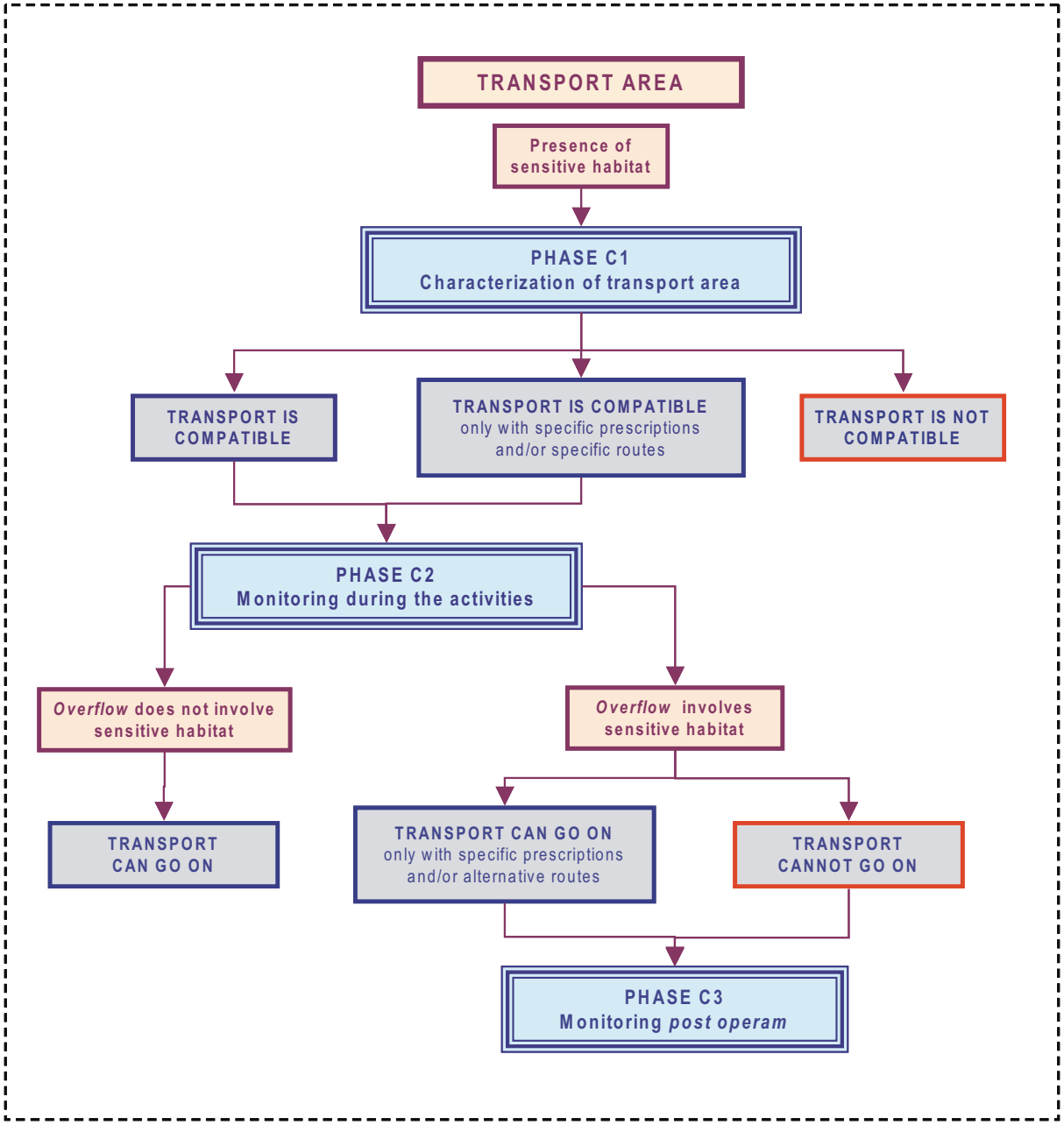

Fig. 3. The flow chart of the environmental monitoring protocol related to the transport area

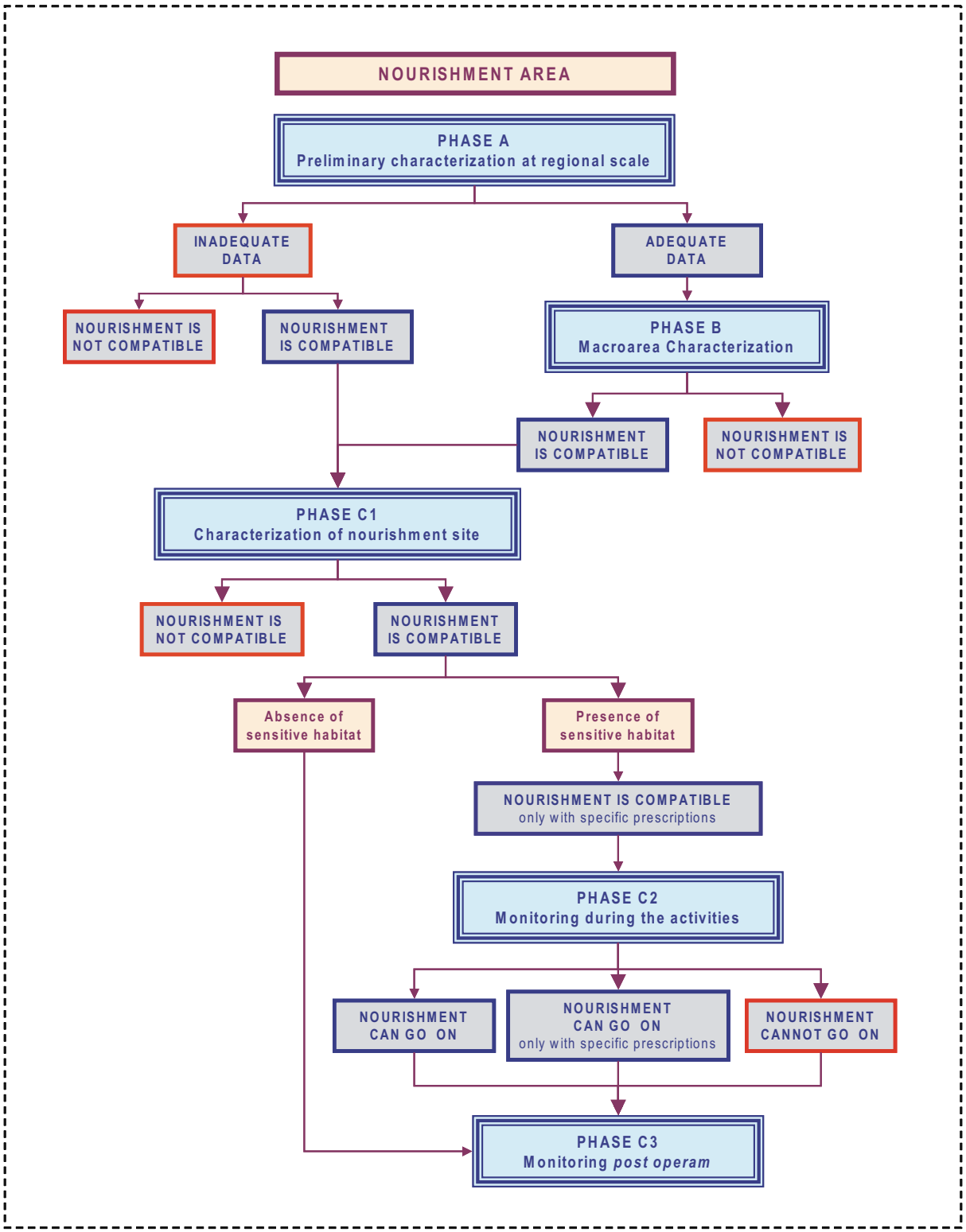

Fig. 4. The flow chart of the environmental monitoring protocol related to the nourishment area

The environmental monitoring protocol has been developed and tested mainly thanks to the experimental operations carried out by ICRAM in collaboration of the local authority "Regione Lazio" along the Latium continental shelf.

The environmental studies performed allowed to establish the optimum methodological approach of environmental monitoring related to relict sand dredging and beach nourishment.

The whole environmental investigation arranged in the monitoring protocol gives a complete picture of the study areas and of the environmental conditions in the surrounding areas. This is an essential instrument for a correct planning of the recovery interventions on the coastal area. Besides, the collected data can be used to arrange specific Monitoring Plans, in order to generally study the effects of interventions and activities on the coastal zone.

This instrument will provide local Administrations with an easy understanding tool to address complex environmental phenomena, also allowing them to evaluate possible future scenarios, set up specific methodologies for both dredging and nourishment, and to carry out other important activities on the coastal area, providing a valuable means for an integrated coastal management.

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FLORA AND VEGETATION ASPECTS AND CONSERVATION PROBLEMS OF DUNAL HABITATS IN APULIA

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GENERAL INFORMATION

The coastal ecosystems of Puglia are extremely fragile, both in terms of their delicate environmental equilibria, which are fundamental to their functioning, and their location in areas at high risk from intense anthropic pressure. Therefore, better knowledge of these particular environments is essential for their proper management.

The coasts are characterised by great variability of environmental conditions, as shown by the diversity of species and plant communities. Phytosociology entails the qualitative and quantitative study of plant populations. It makes it possible to evaluate biocoenotic diversity by identifying and classifying associations (Biondi, 1998).

THE VEGETATION OF ROCKY SHORES

The most highly developed is the so-called “pioneer” vegetation, halophile and rupicolous, of the *Crithmo-Staticetea* class, which is highly differentiated along the Italian coasts, especially on the islands. Typical chasmophytic vegetation, directly exposed to the action of the sea, it is characterised by rupicolous halophytes. It is found in hollows in the rocks (wells of salt water) or in the cracks of maritime rocks subject to sea-spray.

It lives in extreme ecological conditions, and is thus floristically very poor and of limited coverage.

Of great naturalistic value is the presence almost everywhere of endemic *Limonium* spp., typical of regional associations (***Limonietum japygici*** *Curti e Lorenzoni 1968;* ***Crithmo-Limonietum apuli*** *Brullo 1988;* ***Limonio-Plantaginetum Grovesii*** *Bartolo Brullo e Signorello 1989)* (Bartolo *et al.*, 1989).

The vegetation of sandy shores is characterised by a particularly evident dynamism, due both to the erosive effects of the wind and sea and to deposition, which cause the retreat or advance of the coastline.

THE VEGETATION OF THE BEACH

The vegetation of the beaches and the dunes is composed of a succession of phytocoenoses moving from the waterline to the more stable areas behind the dunes.

Immediately beyond the aphytic zone of the inter-tidal zone, growing on coastal soils enriched by the mineralisation of organic matter washed ashore by the sea, the vegetation is open and discontinuous, composed of halophile and nitrophile therophytes, meso-hygrophilous, and flowering in spring-summer. This association is called **Salsolo kali-Cakiletum aegyptiacae** (= maritimae) Costa et Manz. 1981. The typical species of this association are: *Cakile maritima* Scop. ssp. *aegyptiaca* (Willd.) Nyman, *Salsola kali* L. ssp. kali, *Polygonum maritimum* L. Talvolta. In highly nitrophile conditions, the Asteracea *Xanthium strumarium* L. ssp. italicum (Moretti) Love is present, characterising the sub-association ***Xanthietosum***, discovered in many localities of the peninsula and especially along the beaches of the Adriatic.

The **Salsolo kali-Cakiletum aegyptiacae** association forms part of a habitat of community interest under the terms of EU Directive 92/43, i.e., **Annual vegetation of drift lines.**

THE VEGETATION OF EMBRYONIC DUNES

Further up the beach, where the waves reach only rarely, the first accumulations of sand are formed, referred to as embryonic dunes, where some perennial species appear. An example is the sand graminea *Elytrigia juncea* (=*Agropyron junceum*), which produces horizontal rhizomes which, in order to avoid the salt water, do not grow far underground but grow horizontally, fixing the grains of sand. This vegetation is commonly known as “agropyretum”. This association becomes sporadic or absent in the stretches affected by erosion. From the phytosociological point of view, this vegetation belongs to the **Echinophoro spinosae-Elymetum farcti** association. A sub-association of this association has been identified, containing the Asteracea *Otanthus maritimus*, referred to as: **otanthetosum maritimi**, which grows near the more inland and stable embryonic dunes. *Otanthus maritimus* is covered in a whitish velvety layer (hence its name, cottonweed) which protects it from strong sunlight and slows loss of water by transpiration. Also in the more inland areas, sheltered from the salt spray, under conditions of greater anthropic impact, grows a nitrophile variant called *Anthemis maritima*, typical of situations where the dunes are changing shape and the vegetation is becoming buried in sand, as indicated by the abundant presence of *Cyperus kalli* and *Pancratium maritimum*. The variant known as *Sporobolus arenarius*, especially where it is dominant, indicates a flattening of the dunes, often due to anthropic factors which produce a more compact substrate, humid, rich in organic matter and salts due to the easier penetration of the sea under these conditions.

On the embryonic dunes submerged by sea surges, a type of vegetation characterised by the presence of *Spartina juncea* is sporadically found. This often grows in dense species-poor formations. Under these conditions a different kind of phytocoenosis is found, belonging to the association **Elymo farcti-Spartinetum junceae**.

THE VEGETATION OF THE SHIFTING DUNES

Further away from the water line than the embryonic dunes are the shifting dunes. These are typically colonised by *Ammophila arenaria* (= *A*. *littoralis* or *A. arundinacea*), which forms dense populations, especially in the stretches of beach not exposed to erosion, contributing significantly to the consolidation of the dunes. Another common species here is the apiacea *Echinophora spinosa*. The perennial herbaceous vegetation of sandy calcareous Mediterranean and Atlantic coastal dunes belongs to the Ammophiletea class. The species that are characteristic of this class are *Ammophila arenaria*, *Elytrigia juncea*, *Euphorbia paralias*, *Calystegia soldanella*, *Eryngium maritimum*, *Pancratium maritimum*, and *Medicago marina*. The phytocoenosis in which Ammophila is prevalent belongs to the association **Echinophoro spinosae-Ammophiletum arundinaceae**

The **Echinophoro spinosae-Elymetum farcti** and **Elymo farcti-Spartinetum junceae** associations identify a habitat of community interest referred to as **Embryonic shifting dunes**.

The Echinophoro spinosae-Ammophiletum arundinaceae association identifies the habitat of community interest referred to as **Shifting dunes with *Ammophila arenaria*** ("white dunes")

THE CHAMAEPHYTIC VEGETATION OF THE CONSOLIDATED DUNES

The first consolidated, but not yet stable belt of the dunes is partly colonised by mainly chamaephytic and hemicryptophytic vegetation, dominated by *Crucianella maritima* and *Helichrysum stoechas*. This vegetation belongs to the **Crucianelletum** association (Vagge e Biondi 1999).

The **Crucianelletum** association identifies a habitat of community interest under the terms of EU Directive 92/43 called ***Crucianellion maritimae* fixed beach dunes**.

THE CHAMAEPHYTIC AND PHANEROPHYTIC VEGETATION OF THE CONSOLIDATED DUNES

The more inland dunes, by now consolidated, are colonised by formations of pioneer maquis composed of *Juniperus oxydedrus* subsp. *macrocarpa*, which represents the vegetation of transition between the phytocoenoses already examined and those of the Mediterranean maquis and scrub of the area inland from the dunes. These are generally dense formations composed of various shrub species including: *Rhamnus alaternus*, *Pistacia lentiscus*, and *Phillyrea latifolia*. These phytocoenoses

belong to the association ***Asparago acutifolii-Juniperetum macrocarpae***. Of this association there exists the sub-association known as **juniperetosum turbinatae**, which corresponds to the more inland and sheltered formations, with a partly rocky substrate.

In northern Italy, Asparago acutifolii-Juniperetum macrocarpae is replaced by another association known as **Spartio juncei-Juniperetum macrocarpae**, which is found in place of the former in less arid conditions.

The shrub associations described above belong to the priority habitat known as **Coastal dunes with Juniperus spp.**.

TEMPORARY HERBACEOUS VEGETATION OF THE DUNES

The class known as Tuberarietea guttatae includes the seasonal vegetation (xerophilous therophytes) of the subacid oligotrophic sandy soils (Brullo et al., 2001). Typical species are: *Tuberaria guttata, Vulpia membranacea, Cutandia maritima*, and *Psiliurus incurvus.*

To this class belongs the association known as ***Sileno coloratae-vulpietum membranaceae***, which is found in the gaps between patches of ammophiletum. This annual association, weakly nitrophile, generally short-lived and observed in spring, grows on crumbly but fairly fixed sands. It is characterised by the presence of *Vulpia membranacea* and *Silene colorata*.

This vegetation is associated with the habitat of community interest known as ***Malcolmietalia*** **dune grasslands**.

HERBACEOUS VEGETATION ON THE LANDWARD SIDE OF THE DUNES

This vegetation forms seasonal grasslands composed of xerophilous therophytes growing on oligotrophic partially consolidated calcareous sands, found in Mediterranean and sub-Mediterranean regions. For example, in southern Italy, in the middle of slightly sloping arid depressions and on the flattened tops of ancient dunal cordons (even those distant from the sea and re-shaped by the wind), there are populations which are visually dominated by *Plantago albicans*, a species typical of the Sahara. This steno-Mediterranean hemicryptophyte, in Italy found in Liguria, Puglia, Basilicata, Calabria, Sicily and Sardinia, forms communities that are often compact in highly arid, sandy areas. *Plantago albicans* is always accompanied by *Anchusa hybrida*, another steno-Mediterranean hemicryptophyte that forms striking tufts when it flowers. This association belongs to the Thero-Brachypodietea class and the association known as ***Anchuso-hybridae plantaginetum albicantis*** Corbetta & Pirone (Corbetta et al. 1989). In these grasslands a strange and fascinating psammophilous fungus is also frequently found; referred to as *Gyrophragmium dunalii*, it belongs to the *Secotiaceae* family and has a clear similarity to the genus *Agaricus.*

This vegetation belongs to the habitat of community interest known as ***Brachypodietalia*** **dune grasslands with annuals.**

SUBMERGED MARINE VEGETATION

Inshore waters are characterised by phanerogams belonging to the Zosteretea marinae class, with rooting species typical of coastal and sub-coastal areas, with euhaline to polyhaline waters, forming seagrass beds with marine algae. Of these, the most developed marine plant communities of the temperate, warm and Mediterranean waters belong to the Posidonietalia order. An example is the ***Posidonietum oceanici*** association, which includes seagrass beds of *Posidonia oceanica*, growing in shallow waters. Sensitive to alterations in the coastal environment, these seagrass beds constitute an important ecosystem complex, which produces a large quantity of organic matter and oxygen. In addition, the growth of its rhizomes, both horizontally and vertically, prevents the erosion of the sand and gives rise to a terrace-like formation that resists the erosion of the sea floor (Biondi, 1998).

The seagrasses represent the most extensive community of submerged phanerogams growing on the bottom of the Mediterranean, where they are found at depths of up to 30-40 m. To the Thalassietalia Order belong the tropical communities that have colonised the Mediterranean,

forming pioneer communities on muddy bottoms, e.g., the ***Cymodocetum nodosae*** association containing the phanerogam *Cymodocea nodosa*, found at depths of up to 20 m.

The Zosteretea marinae class includes submerged phanerogams that colonise the muddy beds of lagoons with a clayey substrate which normally emerge at low tide (mudflats) or which emerge only in exceptional cases (marshes); *Zostera noltii*, an Atlantic and Mediterranean species which is found at depths of up to 5 m, forming the association known as ***Zosteretum noltii*** which colonises the beds of lagoons, and *Zostera marina*, a species typical of the ***Zosteretum marinae*** association, which forms populations in highly halophile conditions, preferring gently moving waters, and which contributes significantly to the consolidation of the muddy bottoms of areas subject to water flow or to the constant movement of tides and waves, at times tolerating periods of complete emersion between tides.

Posidonia seagrass beds belong to the priority habitat known as ***Posidonia* beds**.

VEGETATION OF THE LAGOONS

Submerged phanerogams typical of brackish waters, with growth in winter-spring, often drying out in summer, belonging to the Ruppietea maritimae class.

Ruppia cirrhosa is typical of deep waters and characterises the *Ruppietum cirrhosae* association; *Ruppia maritima* grows on beds of varying depth, usually in areas that receive the greatest flows of fresh water from inland, and characterises the *Ruppietum maritimae* association.

The ***Chaetomorpho ruppietum*** association is typical of shallow brackish waters.

The above-mentioned associations identify a priority habitat in the terms of Directive 92/43/EU known as **Coastal lagoons**.

VEGETATION OF SALTY SOILS WITH PERENNIAL SALICORNIA

Succulent chamaephytes and nanophanerophytes of the Mediterranean-Atlantic and Saharo-Sindic “salt steppes” (Chenopodiaceae), belonging to the Sarcocornietea fruticosae class, rich in associations.

The association characterised by *Arthrocnemum macrostachyum*, known as ***Puccinellio convolutae-Arthrocnemetum macrostachyi***, occupies the highest areas in the vegetation of the salt steppes, able to withstand long periods of aridity of the soil and thus pronounced oscillations in saline concentration. Its optimum in the Mediterranean region is linked to areas with a thermo-Mediterranean climate from dry to semi-arid (Géhu *et al.*, 1984).

The plant association characterised by Sarcocornia fruticosa, known as ***Puccinellio festuciformis-Sarcocornietum fruticosae***, occupies the intermediate areas of the salt steppes. Compared to the previous association it prefers soils with lower salinity. Widespread in the Mediterranean, especially in the Northern areas where the climate is cooler and not so dry, but also found along the coasts of Italy.

The associations of this class characterise vegetation that is typical of environments with highly saline soils and identify the habitat of community interest known as **Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*).**

VEGETATION OF SALTY SOILS WITH ANNUAL SALICORNIA

Therophytes made up of annual salicornia, in the Mediterranean all belonging to a single phytosociological order.

Suaedo-Salicornietum patulae Brullo & Furnari 1976 is a pioneer association growing on sandy-mud salty and wet terrain, flooded during winter, with considerable saline concentration in summer when the terrain dries up.

The characteristic species of the association is *Salicornia patula* Dubal-Jouve. The association is mainly mono-species but may also include: *Atriplex latifolia* Wahlenb., *Artemisia coerulescens* L. ssp. coerulescens and *Halimione portulacoides* (L.) Moq.

The diploid salicornia association known as ***Suaedo-Salicornietum patulae*** is found on the higher soils, in direct contact with the perennial salicornia.

The tetraploid salicornia association known as ***Salicornietum emerici*** is found on the inner edges of saltpans, on terrain that is constantly flooded or open to the sea, in the eastern Mediterranean.

Annual salicornia characterise the habitat of community interest known as ***Salicornia*** **and other annuals colonizing mud and sand**.

HYGROPHILOUS VEGETATION GROWING ON THE LANDWARD SIDE OF THE DUNES

Vegetation typical of halophile grasslands, made up mainly of hemicryptophytes (Juncaceae, Cyperaceae, Gramineae) growing on muddy-sandy soils that are always more or less wet, salty and periodically flooded.

The plant association characterised by *Juncus acutus* grows at the base of sand dunes or in the depressions between and behind the dunes, between the psammophilous and halo-hygrophilous communities.

Along the Mediterranean coasts, in the depressions on the landward side of the dunes flooded with brackish water for long periods of the year, grow beds of rushes. Typical species are: *Juncus maritimus*, *Puccinellia festuciformis* subsp. *festuciformis*, *Carex extensa*, forming the association known as ***Puccinellio festuciformis-Juncetum maritimi.***

The alliance known as Plantaginion is characterised by *Plantago crassifolia* and *Schoenus nigricans*, and is typical of brackish depressions on the landward side of the dunes. It grows on compacted, sandy-gravelly more or less organic soils, rich in carbonates, which are wet in winter and dry out in summer. This vegetation belongs to the **Schoeno nigricantis-Plantaginetum crassifoliae** association. Other characteristic species are: *Juncus litoralis*, *Blackstonia perfoliata*.

On the landward side of residual dunes, on sandy soils with varying salinity, grows an association characterised by the presence of the graminea *Erianthus* (= *Saccharum*) *ravennae*, *Juncus maritimus*, *Juncus litoralis* and *Schoenus nigricans* known as ***Eriantho-Schoenetum nigricantis*** Pig. 1953.

The associations of the Juncetalia maritimi order identify the habitat of community interest called **Mediterranean salt meadows (*Juncetalia maritimi*).**

HYGROPHILOUS VEGETATION WITH LARGE HELOPHYTES

Palustrine vegetation growing in fresh or slightly brackish water, typical of many coastal areas in Italy, made up of large helophytes growing in shallow beds of standing waters, on the edge of ponds, canals and lagoons, and in areas flooded for long periods, generally in single-species or species-poor formations.

The most common of these associations is made up of the well-known marsh reed *Phragmites australis*, a species that forms large, often single-species reedbeds growing on soils that are flooded in winter and emerge for a few months in summer. This association is known as ***Phragmitetum australis***, and is typical of fresh waters or waters with more or less variable salinity. Phragmites reedbeds grow on the edges of lagoons and lakes, often extending towards the middle, up to a depth of 50-60 cm. *Phragmites australis* generates a considerable quantity of biomass due mainly to the abnormal development of its underground rhizomes, which over time bring about the gradual silting up of the lakes or lagoons. The presence of Phragmites reedbeds thus causes problems for the management of such areas because their development causes the closure of the pools of open water, to the detriment of the avifauna and the other hygrophilous plant species.

Another association that grows in fresh waters is characterised by the presence of *Cladium mariscus*, a species that forms large populations in areas characterised by fractured calcareous substrates and spring waters rich in carbonates. Cladium populations belong to the ***Cladietum marisci*** association.

VEGETATION OF TEMPORARY PONDS

Pioneer vegetation consisting of algae of the Characeae family of large dimensions which covers the bottom of pools of standing water, fresh or slightly brackish, usually from 3 to 13 cm deep, sometimes up to 20 cm deep. Characteristic species include: *Chara fragilis*, *Chara canescens*, *Nitella* sp. This association belongs to the Charetea fragilis class.

Ponds with Chara vegetation correspond to the habitat of community interest known as **Hard oligo- mesotrophic waters with benthic vegetation of *Chara* spp.**

RHIZOPHYTE FRESHWATER VEGETATION

This type of vegetation is made up of species living in mesotrophic to eutrophic fresh water, which sink roots into the bed and have floating stolons and leaves, and flowers generally emerging from the water. This vegetation belongs to the Potametea pectinati class. Species characteristic of this class are: *Potamogeton pectinatus*, *Potamogeton lucens*, *Potamogeton crispus* etc.

The class is divided into two alliances: Magno-Potamion and Parvo-Potamion. The former includes vegetation with large pondweeds such as *Potamogeton lucens*, which is the characteristic species of the ***Potametum lucentis*** association, typical of slow-flowing fresh waters. The latter includes the vegetation with smaller Potamogeton such as Potamogeton pectinatus, which forms the ***Potametum pectinati*** Corst. 1955 association, typical of flowing calcareous fresh waters.

The vegetation belonging to the Magno-Potamion alliance corresponds to the habitat of community interest known as **Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* type vegetation.**

The Botanical Garden of the University of Salento has for many years taken an interest in the protection of coastal environments and particularly the re-naturalisation of coastal dunes. Specifically, the Botanical Garden is involved in the multiplication of species that are characteristic of the coastal areas, and re-naturalisation projects that include the planting of species and the reconstitution of wild vegetation. Measures of this type have been implemented on the dunes of the Acquatina lagoon, the Alimini Lakes and Porto Cesareo.

SYTAXONOMIC CLASSIFICATION

Cl. Zosteretea marinae Pign. 1953
Ord. Zosteretalia marinae Bég. 1941
All. Zosterion marinae W. Christ. 1934
Ass. Zosteretum noltii Harms 1936
Ass. Zosteretum marinae Den Hartog e Segal 1964
Ord. Thalassietalia Den Hartog 1976
All. Cymodoceion nodosae Den Hartog 1976
Ass. Cymodoceetum nodosae Br.-Bl. 1952
Ord. Posidonietalia Den Hartog 1976
All. Posidonion oceanicae Br.-Bl. 1952
Ass. Posidonietum oceanici wolff 1968

Cl. Crithmo-Staticetea Br.Bl. 1947
Ord. Chritmo-Staticetalia Mol. 1934
All. *Chritmo-Staticion* Molinier 1934
Ass. Limonietum japygici Curti e Lorenzoni 1968
Ass. Crithmo-Limonietum apuli Brullo 1988
Ass. Limonio-Plantaginetum grovesii Bartolo Brullo e Signorello 1989

Cl. Cakiletea maritimae Tuxen & Preising 1952
Ord. Cakiletalia maritimae Tuxen 1952
All. Cakilion maritimae Pignatti 953
Ass. Salsolo kali-Cakiletum aegyptiacae (=maritimae) Costa et Manz. 1981

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Ord. Ammophilion australis Br.-Bl. 1921
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POSIDONIA OCEANICA L. (DELILE) SEAGRASS MEADOWS ALONG THE APULIA COASTS

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SUMMARY - In this paper a short review is given of the current state of knowledge on the distribution of *Posidonia oceanica* seagrass meadow along the Apulia coasts. After illustrating the bio-ecological significance of these meadows in the Mediterranean Sea and reviewing the causes of their degradation, the Author describes the activities carried out in the framework of a regional project developed for map-making purposes along the Apulia coasts. *P. oceanica* meadows currently extend over a total area of more than 330 km^2, of which about 225 km^2 on *mats*, 1.51 km^2 on rocks, 21.73 km^2 on sand, 60 km^2 with mosaic on hard substrates and about 26 km^2 with dead *mats*. Surveys were carried out in the year 2005-2006.

Key-words: *Posidonia oceanica,* South Adriatic Sea, Ionian Sea, SCI.

INTRODUCTION

Undoubtedly, knowing the real extension of *Posidonia oceanica* meadows along the coasts of a region is extremely important for proper environmental monitoring aimed at preventing the risks of degradation of the marine ecosystem. *Posidonia oceanica* is indeed not only a typical species of the Mediterranean but a complex biocenosis where interaction between the abiotic (sediments, light, water quality, etc.) and biotic (epibiont, competitor, predator, and guest organisms, etc.) system is in its own right a “complex system” and oftentimes difficult to be modelled.

On account of such an important role, *P. oceanica* meadows have been entered in the Habitats Directive (92/43/CEE) and have thus become a Site of Community Importance. *Regione Puglia* (Puglia Regional Authority), following on an early activity developed by Snamprogetti in 1990 on behalf of the Ministry of the Environment, had made 1:25.000 scale maps of *P. oceanica* Apulia meadows, using the instruments available at that time. Though state-of-the-art instruments and technology available in the '90s had been used, the spatial distribution of this biocenosis was approximate. In 2004, *Regione Puglia* entrusted the *Consorzio per la Ricerca Applicata e l'Innovazione Tecnologica nelle Scienze del Mare* (Syndicate for Applied Research and Technological Innovation in Sea Sciences) - with the participation of the *Associazione Armatori da Pesca* (Association of Fishery Ship-owners) of Molfetta - with the task of making an “Inventory and Cartography of *Posidonia* seagrass meadows in the Maritime Districts of Manfredonia, Molfetta, Bari, Brindisi, Gallipoli and Taranto” (ROP (Regional Operational Programme) Apulia for the period 2000-2006). The complete documentation including graphs, photos and informational works was submitted in the autumn 2006.

MATERIALS AND METHODS

The operational and technical-scientific activities were carried out with the collaboration of the *Cooperativa Nautilus* and *Cooperativa* COISPA. For better framing the work, a Scientific Committee was set up including professors and researchers, each with relevant experience in this matter, who verified the different proposed activities *ex-ante*, in the course of the project and *ex-post*, thus providing the developers with a set of cognitive tools for the implementation of the project.

For making the cartography of *Posidonia oceanica* meadows along the Apulia coast, the following equipment was used:

- Side Scan Sonar (SSS), a sonar that can look sideways and yields a morphological map of sea bottoms ;
- Single beam, a device for precision bathymetric measurements;
- ROV (Remote Operate Vehicle): an underwater tethered video camera operated by a person aboard a vessel;
- GIS, a satellite positioning system that calculates the position of the vessel with an extremely high precision degree (no more than two-meter error).

Additionally, at a limited number of selected *ad hoc* stations (10 meadows), biological sampling by diving was performed, and three stations along the coast-offshore transects in each of the 10 meadows (in proximity of the upper limit, of the intermediate zone and at the lower limit) were investigated. At these stations, phenological (for instance, coverage, morphology, shape of the limit, etc.) and lepidochronological analyses (age and growth of the meadows) were performed. Further biological analyses were made on epiphytes and borers and genetic analyses were performed on 4 out of the 10 meadows.

POSIDONIA OCEANICA SEAGRASS MEADOWS

Posidonia oceanica L. (Delile) is a species endemic to the Mediterranean Sea and, as any other higher plant, has roots, stem and leaves. The plant bears flowers and fruits, but not annually, though its typical growth is asexual through shoots. *Posidonia* stands play a critical role in the Mediterranean basin.

Most importantly, it has a structuring function in the marine system in that its roots - the rhizomes - stems and leaves form a vegetal bed that is shelter and home to a great variety of marine species. *Posidonia* meadows are nursery areas for a number of marine species and, through their photosynthetic activity, they guarantee increased primary productivity of the coastal strip as well as oxygen to the overlying mass of water.

Posidonia oceanica meadow plays a fundamental role for the protection of the coastal strip; it protects beaches from erosion by mediating the motion of waves through its leaves and trapping sediments by its rhizomes.

The dead leaves of *Posidonia* can be washed up on beaches and form leaf litter accumulations ("banquette") that indeed protect the coast from wave erosion, especially in winter time. These leaves mineralize and significantly contribute to enrich coastal waters with mineral salts.

Posidonia stand is a very good bioindicator of the environmental quality. In particular, a significant increase in water turbidity, oftentimes due to an increase in sedimentable solids in water as a result of coastal erosion, in fact causes appreciable degradation of the meadow and its subsequent disappearance. This has frequently occurred in consequence of the change in the coastline caused by the construction of harbours, docks and breakwaters.

On account of its fundamental role in maintaining the biodiversity of the Mediterranean Sea, *P. oceanica* was designated to be protected under numerous International Conventions (Bern, Barcelona). Moreover, *Posidonia* stands represent one of the Habitats included in Annex 1 "Natural habitat types of Community Interest whose conservation requires the designation of special areas of conservation" of the Habitats Directive 92/43/EEC of 21 May 1992.

RESULTS

In the framework of the project carried out in 2004, an "Atlas of the Maps of *Posidonia oceanica* meadows along the Apulia coasts" was produced on a scale 1:25000.

Some more interesting areas were subsequently mapped on a scale 1:10000 for a more accurate representation. Maps were also submitted in the digital format, thus making it possible to enlarge and print single portions of the map.

In the Ionian-Salento sector, some rather extended and high naturalistic value meadows were found at: Isola di San Pietro, Torre Colimena, S. Isidoro, Gallipoli and Torre Mozza. Generally speaking, thanks to the very good clarity of Ionian waters, the lower limit often extends down to 25-30 m depth and in some cases, as at Torre Colimena, meadows extend up to 6 kilometres from the coast.

Because of degradation, the coastal strip often exhibits dead mats with the upper limit being at 10 m on the average.

In the Ionian sector, *Posidonia* meadows are generally on mats sometimes on sand and on rock, at times they form intricate mosaics.

In the Adriatic Sea, *Posidonia oceanica* is only present from Otranto to north of Bari; it disappears immediately beyond and it only is alive in small patches like at Tremiti islands, which is the northernmost Apulia place where *Posidonia* is present. In fact, further northward, this phanerogam is only present in some areas near Trieste (Muggia Bay).

The Adriatic meadows are considerably less extended width-wise (max 3 km, nearby Brindisi) and almost all of them are on mats, often dead because of evident coastal degradation. North of Barletta, areas where *Posidonia oceanica* is completely absent but with extended dead mat have been found, and this is a well-documented proof of the degradation of previous meadows once extending over that area.

Numerous biological data (phenological and lepidochronological) have been surveyed in the course of this project in 10 of the identified meadows and they are of importance for the purpose of continuous environmental monitoring. Of equally great scientific interest are the results from the genetic analyses performed on 4 Apulia meadows which showed how the excess of heterozygosis observed in the population of Gallipoli and Otranto is an indicator of good health of these meadows. Vice versa, the monoclonal status of the meadow present in the archipelago of Tremiti Island, is indicative of a condition of genetic isolation, already observed indeed in some existing populations along the Croatian coast. This would make the whole meadow fragile if exposed to any degradation phenomena. In this regard, it is observed that the *Posidonia oceanica* meadow present at Tremiti Islands has already been severely damaged because of continuous anchorage of vessels, even of high tonnage, especially in the summer period.

CONCLUSIONS

The project has provided *Regione Puglia* with a rather accurate cartography of the existing *Posidonia* stands along our region. This geo-referenced cartography is included in a GIS where any additional information and/or change about special areas can be real-time updated. These cartographic data are then supplemented with various biological data that can form a historical data set of notable scientific importance in order to assess the existing quality status. In these terms, the meadows of Torre Colimena, Ugento and Campomarino are the ones presenting the best quality status. These three Ionian meadows may add up to the lower quality Adriatic ones of Cesine and Torre Guaceto that exhibit symptoms of stress at the lower and upper limit, respectively.

Finally, along the Apulia coasts, *P. oceanica* is present over a total area of about 330.18 km^2, of which 224.91 km^2 on mats, 1.51 km^2 on rock, 21.73 km^2 on sand, 60.48 km^2 on mosaic of *Posidonia oceanica* with hard substrate and 21.55 km^2 of mosaic with dead mat. The dead mat, with no live phanerogam, extends over about 9.1 km^2. Evidently, this extent was recognized and identified at this stage of the survey though one cannot exclude the presence of further extents of dead mats covered with sediments and thereby unidentified, which would further prove the significant reduction of *Posidonia* stands along the Apulia coast.

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INTEGRATED COASTAL ZONE MANAGEMENT IN EMILIA-ROMAGNA

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INTRODUCTION

Since the early history of mankind, coastal areas have served as a major crossroad of civilization, on account of their trade potential and available foodstuffs and goods.

Today, coastal areas of the European Union harbour almost half of the EU population and produce most of the economic wealth of the Union: fishery, maritime transport and tourism contend for vital spaces along the 89,000 kilometres of the European coastline, jeopardizing some of the most fragile and precious habitats in Europe, with resulting social, economic and ecological effects that often extend across national borders.

According to the EU Directive, eight out of the forty priority natural habitats to be preserved are natural and semi-natural habitats and wild fauna and flora belonging to coastal areas, in addition to one third of wetlands of the Union and of special protection areas for wild birds.

The dynamics of natural coastal processes - including tidal regimes, climatic conditions and sediment transportation mechanisms, as well as hydrological connections between the watershed and the coast - have influenced the humans' capacity to sustain their activities in coastal areas and resulted in increased risks and costs to sustain infrastructures and resident populations under conditions of sea level instability caused by climate changes or local subsidence phenomena sometimes aggravated by inadequate localization of new infrastructures or overexploitation of biological and mineral resources, thereby compromising even the capacity of such areas to accomplish a number of their essential functions that are typical of “transition” habitats with quite various natural habitats of high biodiversity but scarcely extended. Lagoons and delta environments are today relict areas of ecosystems that were once widespread in the coastal areas of the Mediterranean. Through adapting human needs, these have mostly disappeared or are highly degraded. Many of the animal and plant species associated to them are placed since long on the list of endangered species.

Most of the coastal ecosystems have a very high biological productivity, and harbour areas for restocking and growth of fingerlings of most fish and mollusc species of commercial interest. A notable portion of catches of these species originates from these areas, where half of the fishery sector jobs are concentrated.

Out of the 700,000 hectares of coastal marshes and lagoons existing in Italy early in the 20th century, 192,000 were left in 1972 and less than 100,000 in 1994, whereas 75% of dune systems of southern Europe (from the straits of Gibraltar to Sicily) have disappeared since 1960.

The increase in both resident and temporary population creates social tensions between the possible uses of coastal areas: low impact uses have often been replaced by intensive ones that are profitable in the short term but undermine the coast potential, in the long run, by reducing its social and economic value and jeopardizing the conditions for its own reproducibility.

The quality of coastal waters is at risk: the two most spectacular phenomena of these last years (black tides, resulting from sea accidents of hydrocarbon transportation, and algae proliferation) have shown that the marine-coastal area is oftentimes exposed to the effects of inland or off-shore generated events and activities. The age-old occupancy of coastal areas by men and exploitation of coastal resources have created original forms of rural and urban landscapes mostly characterized by outward exchanges. Diffuse urbanization (linear cities) and agricultural and industrial development have strongly reduced biological diversity and cultural identity of landscapes in many European regions.

Human activities in coastal areas (industry, tourism, agriculture, fishery, aquaculture, energy production) all tend to collectively develop on the narrow coastal strip and to come into conflict with each other and with the preservation requirements of natural environments and landscape. The associated strong seasonal variations of tourist activities and environmental pressures are further complications to sustainable development in coastal areas.

In many countries, awareness of their criticality and of the need for better management have brought about specific regulations, national strategies, regional management plans, studies, inventories and researches, legislative measures and instruments whose application should contribute to the preservation of costal environment.

The set of available regulations in force is satisfactory, but they are far from being full effective due to the lack of coordination between instruments and actors impinging upon the evolution of coastal areas.

This doesn't refer only to horizontal relationships between sectors of activity, but also to the connection between policies and actions performed at various scales of territorial competences (local, regional, national and European). A too stringent application of the subsidiarity principle often leads to the fragmentation of responsibilities, which are then apportioned among the local competence levels failing to consider the multiple interactions between each other. Due to a lack of coordination, the complex relationships between human activities and coastal areas are disregarded (sometimes single measures do not achieve their objective or even interfere with it), by neglecting the complexity of these areas exposed to multiple interrelated forces and pressures (as it is the case for the hydrological, geomorphologic, socio-economic, administrative, institutional and cultural systems), whose sustainable management necessarily requires focusing attention simultaneously on all the numerous systems acting on coastal dynamics.

To do that, adequate data collection, production of relevant information and indicators, a good flow of communications, and a wide use of integrated evaluation techniques are required.

Sound coastal zone management is based upon understanding the dynamics and natural processes of coastal systems, to support them rather than countering them, enlarging long-term options and making them more environmentally sustainable and profitable in the long run, acknowledging the uncertainty of the future and promoting a systemic and flexible approach, integrating all the concerned players in the planning and programming processes through a form of involvement that generates shared commitment and accountability, that uses local know-how, contributes to identifying real matters and leads to feasible solutions through a consultation and participatory approach.

Sustainability-oriented coastal zone management can only succeed if a set of legal and economic instruments, voluntary agreements, information supply, technological solutions, research, education and training are used.

Conclusively:

- **Better consultation between stakeholders is the basis for sustainable development.** It is useful for recognizing synergies or contradictions between actions resulting from different policies, and facilitates the acceptance of arbitration where applicable, making players aware of their responsibilities.
- **Such consultation approach can only develop if it is based on thorough and readily understandable information** on the state of the environment, on the causes of the changes it is subject to, on the political implications and measures at any level, and on available options.
- **Consultation is a strategic choice to be fuelled by defining mechanisms and working methods for dialogue between players of the different sectors as well as by having *continuous exchange of information* between the various levels of territorial competence, from local to national and community level and *vice versa*.**

THE INTEGRATED COASTAL ZONE MANAGEMENT (ICZM) OF EMILIA-ROMAGNA REGION

Emilia-Romagna regional government has chosen to prioritize an integrated and multisectoral approach in developing its ICZM project, this being conceived as a specific plan aimed at guiding a

balanced development of coastal activities and positively influencing all inland and marine factors that weigh upon this unstable equilibrium territory, with the purpose of steering interventions towards proactive policies capable of foreseeing, linking and facing, in a coordinated manner, emerging and pressing phenomena like the sea level rise and the geological and geo-morphological transformation of territories.

The regional government has thus chosen to face coastal problems by interrelating biological, ecological, physical, economic and social issues:

1. Coastal physical system, risk factors and protection strategies

- Geological and geo-morphological characterization of the emerged and submerged coastal strip
  - watersheds;
  - subsidence;
  - hydrology and hydrogeology ;
  - coastal morphodynamics;
  - sedimentology;
  - biocenosis.

- Protection of the coastal strip:
  - Reconstitution of the beach profile through beach nourishment;
  - Programming maintenance actions;
  - Management of coastal protection works ;
  - Management of sediments along the coast;
  - Characterization of submerged sand deposits as potential reserves to be used for beach nourishment purposes.
- Evaluation of restoration and mitigation actions on sensitive and/or compromised areas
- Compatible use of the Public Maritime Domain
- Evaluation of Integrated Hazardousness and Risk

2. Pollutant loads, water resources management, monitoring

- Municipal-industrial sector
  - municipal wastewater collection;
  - purification of municipal wastewaters;
- Agro-zootechnical sector
  - agriculture;
  - animal husbandry;
  - extension, control and experimentation services;
  - training, extension services, information;
- Drainage network
  - drainage network characterization:
  - control and experimentation:
  - training, technical assistance, information;
- Monitoring and control networks of water bodies
  - Framework of objectives, of strategies and actions;
  - Purposes and strategies of marine-coastal monitoring.

3. Ports, wastes from vessels, risks related to maritime transport

- Safety in navigation, mooring, loading and unloading activities in ports
- Optimal procedures designed to reduce pollution in ports
- Reducing disposal into the sea of wastes from vessels and of loading residues
- Establishment, adaptation or improved availability and use of port facilities for reception, collection and storage of wastes from vessels
- Increased level of observance of rules and legality
- International protection of special marine and coastal areas of high nature, economic and cultural value against risks related to dangerous maritime transport
- Improved quality standards and operational conditions of ships that transport polluting and/or dangerous loads in marine areas at risk.

4. Enhancement of habitats, biodiversity and landscape

- Protection of biological and ecological values
- Recovery, maintenance and increase in biological and ecological values previously exhausted or disturbed by human activities
- Promotion of sustainable use of resources
- Monitoring, research, education and training
- Environmentally-friendly forms of recreation and tourism.

5. Tourism

- Integrated planning and management of tourism-related activities
- Tourism-environmental enhancement of coastal areas and territorial marketing
- Adopting environmental management systems of tourism undertaking.

6. Fishery and aquaculture

- Rationalization of capture and stock raising with special focus on
  - reduction of impacts;
  - reduction of the fishing effort;
  - increased selectivity of fishing gears.

7. ***Agriculture***

- Curbing diffuse pollution
- Curbing erosion and subsidence
- Development of sustainable agricultural activities in coastal areas
- Water saving for irrigation and improved distribution network efficiency.

8. ***Energy resources***

- Optimization in energy resources management
- Energy saving promotion
- Development and enhancement of renewable sources.

9. ***Settlements and infrastructures (services and mobility)***

- Introducing the environmental and territorial sustainability dimension in planning instruments and applying procedures of Environmental and Territorial Sustainability Strategic Assessment and Strategic Environmental Assessment (ETSSA/SEA) to the planning system
- Monitoring and weighing the evolution of the settlement system, of the implementation, effectiveness and impacts of planning instruments
- Renewal and adjustment of urban and territorial planning to contribute to the “Integrated Coastal Zone Management”
- Rationalization and qualification of public environmental services
- Large-scale Integrated water resources management
- Sounder connections and public/private mobility in the coastal system.

Training and communication is an important cross-party dimension of the concerned areas. At the implementation stage of the project, they have play and will keep playing a major role in the decision-sharing process.

The knowledge and policy statement pathway for which, as a guarantee, an Institutional Committee intended as a strategic reference for elaborating guidelines and assessing achievements has been established.

The Committee also includes the participation of relevant Regional Councillors, namely of

- Agriculture, Environment and Sustainable Development, in the capacity of President;
- Mobility and Transports;
- Soil and Coast Conservation, Civil Protection;
- Tourism and Trade;
- Productive Activities, Economic Development and Telematic Plan;
- Territorial Planning, Housing Policies, Urban requalification.

Presidents of the coastal Provinces: Ferrara, Forlì-Cesena, Ravenna, Rimini.

Mayors of the 14 coastal Municipalities: Goro, Codigoro, Comacchio, Ravenna, Cervia, Cesenatico, Gatteo, Savignano sul Rubiconde, S. Mauro Pascoli, Belluria-Igea Marina, Rimini, Riccione, Misano Adriatico, Cattolica.

An inter-sectoral Project Committee has guided, supported and monitored every stage of activity, ensuring integration between various subject areas and departments of the Region:

- Directorate General for Environment and Soil and Coast Conservation, in charge of coordination;
- Directorate General for Agriculture;
- Directorate General for Territorial Planning and Mobility Systems;
- Directorate General for Productive Activities, Trade, and Tourism.

The working groups that have elaborated the guidelines of the Integrated Coastal Zone Management, included a multiplicity of experts and researchers from public bodies, research institutes, Universities and national and international Associations, technicians from the Region and Local Authorities. The technical-scientific support to the activity of the working Group was given by the *Fondazione Cervia Ambiente*, with the collaboration of "Macroscopio" enterprise and with the participation of the environmental agency ARPA, of the Marine Research Centre and of the *Parco del Delta del Po*.

INTEGRATED POLICY OF THE COAST SYSTEM

The experience of Emilia-Romagna Region has been an opportunity for an exchange of views between sectors inextricably connected to each other in affecting the state of the ecological health and urban functionality of the coastal territory, and that are only hardly, and sometimes accidentally, involved in a dialogue conducive to building a thorough and unitary image of a territorial domain.

It is not by chance that such need was felt for the coast, since the sea, by its presence, by its direct and indirect influence both in modelling the mainland and affecting other aspects that cannot be necessarily represented through maps, is a **unitary** element that escapes the management approach usually applied to the territory inhabited by humans.

The basic concept, intrinsic to the notion of "integration", is the importance to make room for the fullest and most complete recognition of the coastal domain as a unit system, knowing from the start how hard it was for the available provincial tools in force to **represent** the coast as a unitary territorial body.

Curiously, the coast, though sometimes impressively standing out as a unitary subject (as metaphorically represented by the statistical data on the tourist season made known at the end of last summer), breaks up at the level of the numerous provincial territorial plans - within each province - and gives the way to other prevailing territorial contexts.

Such a circumstance, which is not trivial at all, begs the question as to how to **represent the coast as a unit**, so as one immediately evokes a mental image correlated to it when wishing to be operative and go ahead with the effective implementation of the guidelines for the coast.

Should we manage to identify the territorial system we term "coast", and represent it through a unit map, in many respects we would not yet be in a position to represent the wholeness of the coast adequately enough.

Quite significantly, planning instruments at various levels confine themselves to representing the coastal territory - so rich in graphic signs that describe many of its physical characteristics - as bordering a "void", namely the sea.

Indeed, on this usually white and dumb space, artificial reefs are the only outcrops that border and protect beaches, but nautical charts are richer in other signs, evidently concrete enough to be mapped.

As for human uses, in a highly tourist-dependant territory, we can map zones with high beach attendance rate - to be protected from coastal navigation and where the sanitary quality of waters is crucial - and port corridors. On the other hand, in terms of geophysical exchange, it could be interesting to realize how far the brackish underground waters intrude in the mainland and, likewise, how deep the emission cone of nutrients, pollutants and fresh waters flow is in the sea, at the mouth of rivers and canals.

Representing such phenomena is in itself an opportunity for specifying and fully understanding their meaning, and developing a way of thinking where the sea, close to the shore, **also** appears in its concrete terms of being an extension of the mainland and of human uses that take place and expand therein.

Tourist settlement is one of the crucial issues of the "Integrated Coastal Zone Management" programme, starting with the static data of urban sprawling it originated and with the dramatic dynamism related to it, since the coast is a domain where resident population could even double or triple because of the arrival of tourist seasonal populations. Just imagine what does such a population concentration mean in terms of water use, waste disposal, traffic increase. No other factor, among the coast-related investigated phenomena, produces such striking effects.

With a system-approach view, it was thus important not only to promote the urban specification of a macro-territorial (supra-municipal scale) compensation and balancing structure, which is and still remains a purely technical urban measure, but to move further and state that the coastal system and the tourist system do "coincide".

This meant to value the unifying sea factor in the right perspective with respect to other coastal territories.

Perceiving the Coast System as a system characterized by tourist economy, doesn't mean to limit the importance of and the focus on other economic sectors, or turning the Integrated Coastal Zone Management into a possible - though unlikely - Plan for Tourism, but rather to prefer an entity that guides all the others, and to be used for better monitoring the overall efficiency of the system because a clean sea benefits tourism, a sea rich in fish benefits tourism, efficient mobility on the coast benefits tourism, high quality and environmentally efficient coastal agriculture benefits tourism, clean energy benefits tourism.

Tourism, as an ambit for consumption that condenses the most demanding expectations of the modern man (time for holiday is different from time for working: the latter requires adaptation and sacrifices that are peculiar to work, the former is the reverse of it, during holiday humans look for the best, fully turning their mind to themselves, and wanting the best for themselves), is by its nature among the most accurate and sensitive yardsticks of the environmental and social quality of a territory.

From all the above, it is also clear that tourist economy is probably the most fragile and vulnerable sector: any environmental, political, cultural uncertainty factor could strongly reduce its performance.

"Integrated Management" was thus intended to be an approach for governing the regional coastal area, quantitatively capable of combining the multiple policies of the considered sectors by multiplying their effects; and that could be qualitatively capable of putting those policies together for each feeding into the other, influencing and enhancing each other.

The attempt has, perhaps, only partially succeeded and, in any case, it needed to be further investigated in quality terms, this being the feature more related to the synthesis of the global views of those policies and their local effects. The pursued idea - still needing to be developed - was to define a process by which areas so far exposed to high transformation rate should, in perspective, generate compensation measures, not to be viewed in strictly dimensional terms, but rather in quality terms; basically, envisaging a strategy of global territorial, environmental, economic, social and, undoubtedly, cultural equilibrium.

The integration process concerns any sector with all the others. But special responsibility rests with the urban sector, because most of intervention policies are referred to urban planning, this being the level at which they can complement each other.

As previously stressed, tourism is the prevailing economic activity in coastal areas, though fishery and agriculture practiced in areas near the coast, as well as the existing industrial activities should not be disregarded. Nor could we forget the bursting growth of the *Fiera di Rimini* that certainly reflects the relationship with the tourist activity, but has wider development capacities than what had been initially designed to be. **The simplest form of integrated management of the coastal zone economy thus concerns these economic activities, in their relationships to each other and with the environmental, territorial, social and cultural systems.** But, immediately after, integration has to involve the tourist facilities and the permanent residential settlements they originated from, since they are so closely related to each other that failing to interact with each other they would both risk collapsing. Integration is also necessary between tourist activity and its original raw material: namely, the natural marine environment and its biological heritage already partially undermined and damaged.

This two-fold focus on integration of tourist facilities and permanent residences on one hand, and settlements in general and the presence of considerable natural sites, on the other hand, suggests an explicit approach for future territorial planning: namely, to counter by all means the realization of the coastal linear city between Milano Marittima and the delta of Po river: this being the area were wide spaces between settlements are still present, always characterized by the presence of natural vegetation, dunes and water. Whereas between Milano Marittima and the coast of Marche region, the consolidated presence of the linear city suggests that we should integrate settlements with the inland natural sites.

On the other hand, in pursuing both these integration processes, it will be necessary to decide upon an alternative pathway, to be chosen between tourism based on consolidation and qualification of the accommodation entrepreneurial system **(hotels, camp sites and other activities) to be progressively conducted towards a generalized certification of quality rather than on further developing private accommodation facilities.** The high overall accommodation capacity (about 600.000 beds) is currently split into two systems; but it is clear that entrepreneurial accommodation facilities are the ones whose investments produce chain revenue in terms of profits and employment, whereas private accommodation facilities largely put property rent before profits. Nor should we forget that urban-environmental management of the collective accommodation system is undoubtedly more beneficial than management of individual accommodation system.

All the above generates an **explicit urban policy for building and urban requalification of collective accommodation facilities,** aiming at better equipped private accommodation facilities **-** from sanitation amenities to common facilities - and at broader commercial offering - parking spaces, gardens, swimming pools; but, more generally, aiming at the territorial qualification of tourist settlements as a system, making use of the regional law for urban qualification and also of adequate financial supports, for modernization and development of the most important production sector of the coast.

The **decisive weight that the solutions adopted for mobility have upon territorial and environmental planning is finally acknowledged.** The 1998 Regional Integrated Plan for Transports certainly needs to be updated; but as for the coast, it will surely confirm the hypothesis of a modern Coastal Rail System from Cattolica to Ravenna. As for the road network, Romea motorway from Cesena to Venice prospectively offers, at 10-15 kilometres from the sea, a high support capacity for fast-flowing traffic behind the coast, thus confirming the hypothesis of the Regional Integrated Transport Plan (RITP) to transform the old A-road no. 309 into a park-road, hoping that the new motorway will introduce frequent accesses and, nevertheless, in view of stepping up the road network perpendicular to the coast in order to increase accessibility from the new toll arterial road.

Water resources management is of crucial strategic importance among policies subject to integration and involving the territory and the environment; apparently, the contemporary society has only recently realized its importance worldwide. Likewise, it is a major issue for the coastal areas of the region, and it adds up to local subsidence problems, also generated by intolerable overexploitation of underground water. **Rationalization and requalification of purification plants and sewage networks** are the most foregone instruction**.** Additionally, the sewage system has to be designed to accommodate the highly intensive storms that so frequently occur now as a result of climate change; by **multiplying collection and discharge methods to reduce the huge, oftentimes devastating, water outflows to existing outlets.**

Water saving policies have to be fostered by increasing the use of non-potable water for industrial and municipal uses, and promoting sounder water use in agriculture. Last but not least, a typically urban planning intervention indirectly related to water resources is the issue of permeability of **urbanised soils or those to be urbanised, especially in the areas with higher aquifer vulnerability. Undertaking to keep at least 50% permeability of built-up areas,** through systematic planting of public and private open spaces, as well as to qualify the urban landscape and definitely influence the climate of tourist areas, also means to recharge groundwater, ensure high oxygen production and notable carbon dioxide uptake in densely tree-grown areas. Here again, as already suggested for the requalification of collective accommodation facilities, an integrated urban-ecological policy would probably be needed to coordinate and magnify the value and effects of such policies on the territory.

Additionally, as introduced by the new regional Law no. 20/2000, a **concrete link between integrated management policies and the urban planning regulations in force** should be pursued to boost the objectives of these guidelines. The provincial territorial schemes on one hand, and the general town-planning schemes on the other, are called to implement the indications of these **guidelines**.

A critical historical evaluation of municipal development schemes - also in Emilia- Romagna where they are, on average, among the soundest in Italy - refers, for instance, to the overstated private building forecasts and the chronic difficulty to implement public forecasts and green spaces in particular. This critical approach is doomed to change with the implementation of the Law no. 20/2000.

In fact, private forecasts are not automatically confirmed or downsized by the Structural Municipal Schemes that are programmatic rather than restriction-based and, therefore, will not make mandatory forecasts but will provide guidance about location and quantities. It is through the five-year Municipal Operational Plans that binding decisions shall be proposed though based on real available funds of the five-year budget for the expenditure of public services on one hand, and on the commitment by private operators to implement only the actions they undersigned for the five-year period on the other hand. The choice of the location and the amount of new settlements shall thus be prompt public and private decisions not abstractly postponed; quality and amount of private forecasts will then move from theory to practice and the corresponding choices will more easily move from hopes - be they valid or not - to certainties.

The law no. 20/2000 is doomed also to overcome the chronic difficulty of implementing public forecasts and the green space in particular. The equalizing compensation mechanism guarantees the free of charge transfer to the municipalities of areas to be used for green spaces and services: and this by a value three to four times greater than the quota set out so far by the law on standards, thus offering the spaces required for the needs of the whole community and not only for individual settlements. In coastal areas in particular, it would be appropriate for the new urban planning model resulting from the Law no. 20/2000 to include large areas for private green spaces in addition to the free areas for public green spaces, and especially to the service of collective accommodation facilities.

All the above policies, designed to promote the intersectoral integration process, can be defined through regional policies and, in the above-said cases, they can be systematically applied through municipal and provincial urban planning instruments, with indubitable significant effects both at the local and large scale territorial level thereby contributing to positively influence the integrated management of coastal areas of Emilia-Romagna region.

We inevitably refer to the scenario of an "**environmentally friendly" area thus oriented to be renaturized in whatever possible portion, to adopt strategies for low environmental impact mobility and energy supply, to promote and enhance typical products (starting from agri-food products), to be strongly connected to the Apennine territory and its spa activities, to take the challenge of widespread quality certification of settlement-related activities including the environment as well.**

So many questions are still open: we just came out of "not negative" tourist seasons, with a diffused public and private propensity to invest.

The environmental dimension of innovation processes will certainly be one of the most important.

"Mucilage" events are still an open question; the main causal factor is associated with current climate change and its effects on the physical and biological system (sea and ocean temperature rise, reduced current flows and wave strength, increased water-logging, appearance of opportunistic mucus-producing micro-algae, and so forth), so that the solution to the problem is far beyond territorial and institutional ambits and falls within Kyoto Protocol issues. The Riviera (and the Region) succeeded to combat eutrophication by attacking the sources of phosphorus and nitrogen (an action that still needs to be pursued) and obtaining tangible results, whereas local and regional actions on the mucilage are scarcely effective. **Undoubtedly, this phenomenon needs to be continuously watched over through adequate national and European research and monitoring activities. This principle is unquestionably confirmed by the fact that it is also present in many countries of the Planet and crosses regional borders by far.**

In the next decade, also through the transfer of competences on public maritime domain to the Regions, a new process for the renewal of seaside facilities will start. The path will be imitative, slow but constant. A "guideline" is included in the Regional Landscape Plan, and implemented in the various provincial Plans. We should design high environmentally-friendly prototypes (types of material, use of covered surface - for instance photovoltaic roofs - technological plants especially to heat up water for showers) keeping in mind that the challenge is "industrialization" as a whole.

The regional law n. 40/2002 generously supports the innovation processes in hotel accommodation facilities. Reasonably, a portion of these resources can be used for circulating basic kits, simply on "air conditioning and double glazing" in hotels. **In particular, this could be admissible if combined with cleaner and more cost-effective air conditioning technologies than electrical power. In this sense, water saving should equally be promoted since it has proven to yield significant reductions in energy consumption as well.**

Pilot actions on the passenger traffic and goods service traffic could be planned by agreeing with the Municipalities and the public transport enterprises to have public electric traction means running in tourist areas, as it is already the case in many old city centres. The Province of Rimini, for instance, intends to redesign the movement of foodstuffs in the coastal strip, starting from the new Agri-Food Centre of Rimini. **The southern coastal area of the region, the most urbanized areas, has the problem of town standards (**parking areas, sports facilities, and public green space) that are reduced, for "historical reasons", and are designed to be decentralized in the new plans. On the other hand, there are large free areas constrained by the Landscape Plan that, indeed, with the present legislation on expropriations, will never become public because of high costs that are out of the Municipalities' reach.

We should carefully consider how equalizing approaches can overcome such a deadlock in a controlled and environmentally-friendly manner.

For instance, we should try making productive requirements of gas extraction synergic with those of environment preservation and upkeep.

New opportunities need to be further investigated for the use of offshore platform, once their productive life is over. Some reuse forms might include :

- **Wind energy** (interesting applications are present in Denmark) **and photovoltaic energy production;**
- **The creation of the so-called "artificial reef", artificial barriers to be used for fish species restocking, for aquaculture, and increasing biodiversity;**
- **Their use for tourist recreational purposes** (skin diving, recreational fishing), "wellness";
- **The installation of permanent oceanographic stations.**

To conclude, the ICZM Programme of Emilia - Romagna Region recognizes that the environmental quality, together with propensity to innovation and social quality, stand out among the basic factors for successful competition between territorial systems. Development has to be sustainable, under penalty of irreversible deterioration of global climate change phenomena, with resulting effects at the local scale: according to the International Panel on Climate Change of the United Nations, in coastal areas this would result in sea level rise and related temperature rise, the return of eradicated pathogens and the arrival of new ones, deep changes in ecosystems and aggression to biodiversity, saline intrusion, coast aridification.

Such phenomena would be much magnified in the Mediterranean sea, due to its slow turnover dynamics, the growth of tourist pressure, with inevitable impacts on land and water resources use, waste increase and air quality deterioration due to vehicular traffic-related emissions. This adds up to the risks related to goods service, even of dangerous ones.

The *guidelines* highlight an extraordinary set of ideas and projects. Their application can improve the environmental state of the "coastal system" through the solution to or mitigation of old and new problems. Here the Integrated Coastal Zone Management shows its value and becomes, in the view of the Emilia-Romagna Region and of the Institutional Committee, a top priority in the scenario of the choices of territory governance and development policies.

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COSMOS PROJECT AND COASTAL PLANNING
(THE EXPERIENCE OF MIRAMARE NATURAL MARINE RESERVE - WWF ITALY)

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INTRODUCTION

Miramare Natural Marine Reserve (MNMR) (Fig.1) was officially established in 1986 by a decree of the Ministry of Environment that entrusted it to the Italian Association for WWF for Nature (Decree of 12 November, 1986). The State Reserve extends over an area of 30 hectares and is surrounded by a buffer zone of 90 hectares regulated by an Ordinance issued by Trieste Harbour Office (no. 28/98).

The protected area is located around the promontory of Miramare, the coastal offshoot embedded between the marina of Grignano and the Riviera of Barcola, used as a beach by local population in the summer period. It is situated in a marine-coastal stretch, with a rocky coast that gently slopes down into boulders, pebbles and mud formations moving seaward. Seabed is rocky, pebbly and sandy down to a depth of about 8 metres, and subsequently consists of mud, up to a maximum depth of 18 metres. The coast is a typical limestone rock of the Karst highland, this being a territory where Miramare promontory represents a small extension of the coastline.

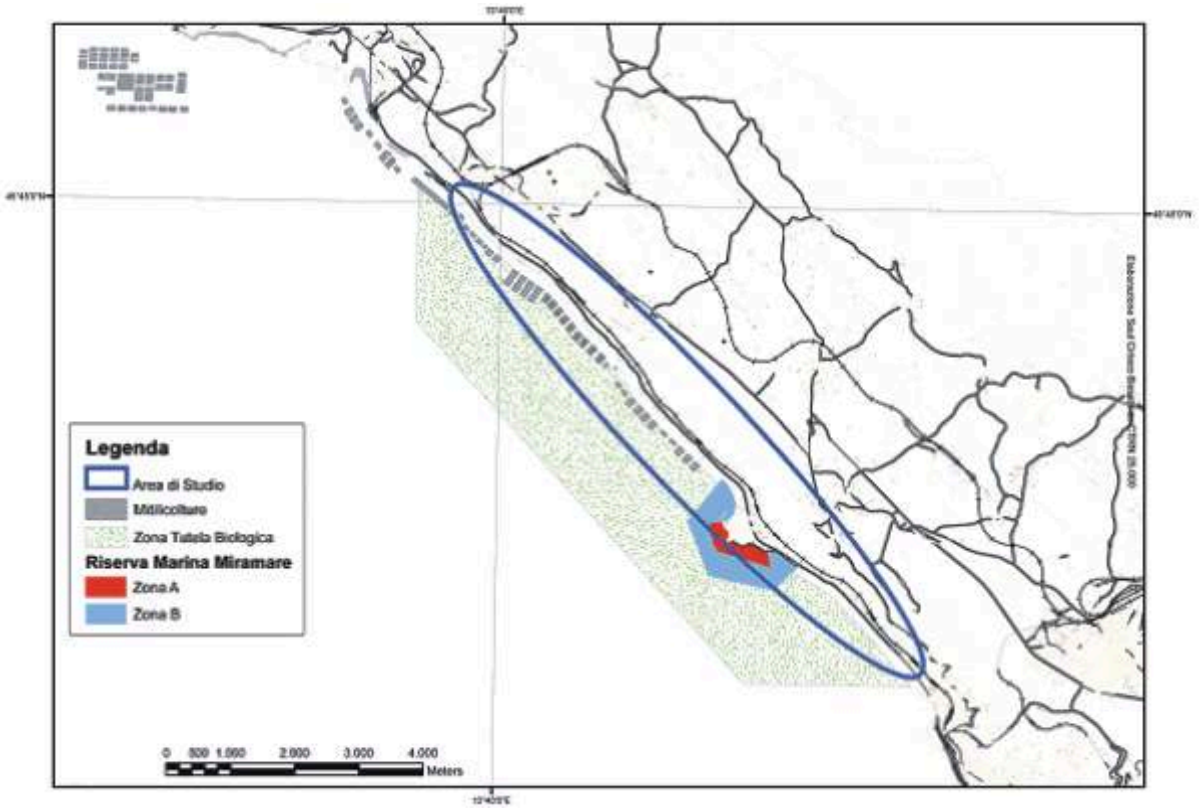

Fig. 1. Miramare Natural Marine Reserve (MNMR) and the study area

The MNMR has always pursued a policy of awareness-raising and dissemination to become known by local players. Since the beginning it stood out as a reference-area in marine-coastal margin of the Gulf of Trieste on account of the scientific research it has developed with various research Institutions, of environmental education projects with the schools of the territory, of the dissemination of information by local and national mass-media, and of concrete examples of tourist activity management of the territory, or of fisheries regulations.

Twenty years from its foundation, the reserve management and environmental awareness-raising activities targeted to the territory apparently became limitative and thus the need arose to set a new territory approach: the reserve shakes off its institutional role and, together with other players, it becomes a stakeholder for the conservation and improvement of marine and coastal biodiversity. Namely, it becomes an actor and a promoter of the knowledge process of the neighbouring territory. Its main objective is to propose and develop sustainable territorial management policies addressed to the neighbouring territory; providing virtuous examples to solve conflicts between all relevant stakeholders.

THE PROJECT

Since the beginning, it was clear that no one-sided choices and visions of the territorial policies had to be imposed; rather, it was evident that shared and conscious policies could be the only means to achieve a broader consensus and reduce or even suppress territorial conflicts. Thereby “A project for awareness-raising and knowledge of the marine-coastal territory through participatory processes following the methods of Agenda 21” was set up. It is a simulation of a Coastal Agenda 21. It is aimed at exploring the possible future of a stretch of Trieste coast through the methods of Agenda 21, namely by:

- Sharing objectives;
- Seeking for stakeholders;
- Exploring future needs, criticalities and wishes;
- Collecting experiences from territories similar to the investigated one;
- Laying the basis for future steps to build a pathway and not simply a project.

When such processes take place in towns, it is easier to find responsive institutions, whereas experimentation in rural areas is scarcer and similar experiences are rare; the coast that stretches from Barcola to Filtri di Aurisina resembles the latter. We thus wanted to consider a territory, a coast that was not densely inhabited so as to determine an experimental methodology applicable to this type of territory, especially in a long, very long-run perspective.

Of course, the project did not originate out of context, rather, it was inspired by the Regional Law in support of the reserve management, which in the past years had already served a number of initiatives and instruments of knowledge dissemination and awareness-raising for the territory. Miramare Natural Reserve thus decided to use this regional financial tool to promote a new initiative that would eventually allow understanding if a new though small entity - the protected marine area - could play a leading spill-over role not only for biodiversity but especially for a new management policy for the whole neighbouring territory: a true support tool for conservation.

Since this was an innovatory process, rather than defining a strict pathway, objectives were identified and enough room was left for any possible adjustment in the course of action and reserving the opportunity and the time to change. In addition to the drafting of a report for the purposes of the Reserve, the expected final achievement was also to make our reality and the related methodology known to public authorities (that are per se involved in such processes).

In fact, the proposed and subsequently financed project was modified *in itinere* following the new ideas that resulted from meetings and workshops. This showed the intrinsic dynamism of the applied process, the fluidity of the pathway, the difficulties in communication between different stakeholders and the difficulties in forecasting the results of a participatory process. That's the reason why the project did not explicitly deal with Agenda 21, but the stated objective was to assess and explore a territory through the typical Agenda 21 participatory tools and approach and not strictly through Agenda 21.

THE WORKING GROUP

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DESCRIPTION OF THE TERRITORY

The coast of Trieste (Fig. 1) is situated in the province of Trieste, in the far N-E of Italy. The stretch of coast investigated in this project extends over about ten kilometres in the N-W direction from the marina of Barcola (situated towards the western periphery of the town) up to Hotel Europa. The inland boundary is the Provincial Road of the Karst highland that runs almost parallel to the karst ridge that stretches out into the Gulf of Trieste. The sea boundary corresponds to the off-shore mussel farming area.

The analysis of the naturalistic and socio-economic characteristics of the territory meets different project requirements. First of all, it provides a report on knowledge available on the various aspects that define the development of a portion of territory. In this sense, two different documents were proposed on the basis of the data collected from numerous sources and on-the-spot visits. The first document, a purely technical one, was used as an internal tool profitably used to upgrade professional skills of the project staff. The second one, a dissemination-oriented synthesis resulting from the first one, was a useful tool describing the territory and addressed to all relevant stakeholders.

Finally, this analysis was a useful starting point for one of the three conceptual lines adopted in defining the set of indicators.

In pursuit of making the analysis as complete as possible, both the naturalistic and socio-economic aspects were addressed; the terrestrial and marine characteristics were considered for the former, and population, traffic, public transport, tourism, pleasure boating, agriculture, fishery, industry and wastes for the latter.

TERRESTRIAL FEATURES

Along the coastal strip - predominantly high, rocky and rather steep - the complex geological and morphological system (surface, underground and underwater) and the geodynamic evolution of the area have brought about really unique geological phenomena that have ever since raised scientific interest at the national and international level (Olistoliths of Miramare, the karst veins of water between Aurisina and Villaggio del Pescatore, the karst sources of Filtri d'Aurisina, the landscape between Prosecco and Santa Croce, the cliffs of Prosecco, some caves of special geomorphological and speleological interest).

The karst ambit of the two provinces of Gorizia and Trieste is of great interest for conservation in that rare and environmentally demanding species are represented. Moreover, some of them are placed on the Italian lists only thanks to Trieste and Gorizia Karst.

One of the most interesting and impressive fauna and vegetational characteristics of the Karst territory in general, is the high number of plant and animal species that are present in this place on the fringe of their biogeographical distributional area. There we notice the concurrent Mediterranean and alpine-middle-European and Illyrian-Balkan influences. That's how species of Mediterranean biogeography co-exist with species linked to mountain-continental species as well as to autumn-winter or alpine species. More specifically, since the coastal strip of Trieste faces South-West, where intense sunshine combines with the mitigating influence of the sea, it s characterized by a Mediterranean climate with a corresponding environment of evergreen species. Holm-oak forest is the most interesting wood formation of this coastal stretch, namely a Mediterranean wood predominantly consisting of evergreen holm-oaks and other Mediterranean species. But, differently from the holm-oak forests of other Italian coasts, Illyrian tree and shrub species are also present in this forest standing, therefore we can more properly refer to Illyrian-Mediterranean maquis. In absolute terms, it represents the northernmost end of the large coastal complex of scherophyll vegetation that climbs from the Peloponnese and extends along Dalmatia and Quarnero islands, and represents to date a unique such an example in Italy. Moreover, on the limestone hillsides facing the sea, and in the stretch between *Duino* and *Cave di Sistiana* in particular, the exclusive endemism Centaurea kartschiana Scop. develops and it is nowhere else in the world.

These environments have a primary faunal interest at the international level since these are places of exceptional value for Herpetofauna (here two eastern species, the nose-horned viper and the European cat snake were first classified and found, respectively), as well as for the exceptional importance of rupestral Avifauna favoured by the wide rocky and inaccessible reaches.

In addition, other ecosystems along this stretch of coast are Saturejo Euphorbietum wulfenii, sage field - Euphorbietum fragiferae and Carpinetum orientalis.

The ecosystems and the vegetational and faunal peculiarities described so far are represented in the recently established “Karst” SPZ that extends over most of the Province of Trieste.

MARINE FEATURES

The foreshore along the Trieste stretch of coast consists of narrow pebbly and gravely beaches lying on the marine terrace that rarely exceeds 10-15 m width. The way to the sea is given by hillside debris that characterizes the seabed immediately facing the coast, dipping in a pelitic-sandy matrix. This material of greater grain size (gravels, pebbles and even boulders), results from marine erosion of the rocky shore and is solely present in the shallow metres. Moving offshore, sands and pelites are more frequent and abundant in the upper layers of the sediment.

This first submerged strip has considerable importance in the Gulf of Trieste due to a combination of circumstances that make it an extremely special and fragile environment. In this northern strip of the Adriatic sea tidal range is among the greatest in the Mediterranean (up to about 2 m under exceptional conditions) thus favouring the establishment of peculiar intertidal community.Additionally, the temperature range of water can reach values as low as 5°C and as high as 28°C thus considerably affecting the presence of both sessile species and nektonic species, in many cases inducing the latter to real seasonal migrations. Nor should we underestimate the considerable influences in terms of salinity and turbidity of water primarily due to the fresh water flowing from Isonzo and Timavo rivers, but also from the Karst springs present in the reach from Grignano to Sistiana. These natural aspects combine with the anthropogenic pressure that directly and indirectly affects these submerged habitats.

In the Gulf of Trieste, the ecological stresses imposed on the environment over the last 30 years - due to impacts sometimes related to unsound management of the coastal strip and, more generally, to climate changes - are particularly evident in the qualitative and quantitative regressions of benthonic vegetation (estimated to be equal to 20% reduction in species in the space of 30 years).

SOCIO-ECONOMIC FEATURES

The central part of the considered area is rather scarcely inhabited, contrasting with the presence of the town of Trieste on one hand, and the built-up area of Duino and Sistiana on the other. Total resident population in the areas is equal to 4,340 inhabitants, 156 of which (4% of the total) reside in the seaward-facing (“sea” zone), whereas the remaining 4,184 (96% of the total) correspond to the residents of Barcola, Santa Croce and Contovello (“mainland” zone).

The analysis of some ISTAT (Italian Institute of Statistics) data shows some differences between the inhabitants of the “sea” zone and those in the “land” zone.

The first difference refers to the structural nature of the settlement: there are isolated buildings in the “sea” zone, and conglomerations of buildings in the “mainland” zone. In particular, the inhabitants of the “sea” zone have a good education background, they are professionals and industrial entrepreneurs. Most of the buildings were built in the 20th century using reinforced concrete and some of them are unoccupied.

Among the residents of the mainland, more young people (less than 26 years of age) are present and educationally speaking most of the population has generally completed compulsory school. In terms of type of employment, they mostly are auxiliary workers and employees and workers in agriculture and industry. Buildings were mostly built before 1900, though town development started after the '90s. In the “mainland” zone there are the only large families of the investigated territory (families with more than 6 members) and foreigners from Africa, Asia and Oceania. Additionally, some population drop is observed in this locations and it is particularly high at Santa Croce.

Interestingly, important scientific institutions are present in this territory (ICTP-International Centre for Theoretical Physics, SISSA-Scuola Internazionale Superiore di Studi Avanzati, TWAS The Academy of Science for the Developing World), and they annually host more than 4 thousand researchers who generally stay for 1 month.

ACTION 1 (participatory approach)

The project was designed to involve all local players (institutions, economic entities, associations) that might have an interest in environmental strategy and coordinate them in a plenary event (Forum or alike). The overall objective being to understand the future scenario of a territory, to tackle specific issues by analysing relevant problems and possible solutions, and thus guide the elaboration of a participatory approach and monitor its application.

For this reason, several participatory events were organized: one first plenary event and some thematic workshops:

1. Use of and access to the beaches and the coastal road: the user's role in the territory (the right to use, recreation, beaches, bathers…);
2. Territory preservation, biodiversity (referring to professional fishing).

The first workshop highlighted some of the criticalities listed below:

- Waste management;
- Perception of scarce decision-makers' awareness;
- Difficulty in identifying specific strategies in an extremely heterogeneous coastal margin;
- Poor accessibility;
- Overcrowding;
- Lack of attractiveness for a possible non-local tourism;
- Lack of organized moorage;
- Lack of an alternative ecological use;
- Excessive use of private vehicles, cars and motorbikes;
- Lack of data.

The second workshop gave priority to the following criticalities:

- Disposal into the sea - fishery;
- Disposal into the sea - biodiversity;
- Preservation of biodiversity - fishery;
- Management of Zones of Biological Protection (ZBP);
- Sports fishery - Professional fishery;
- Aquaculture - Fishery;
- Application and control of fishery rules;
- Quality brands (to control the environment or the site);
- ZBP: no fishing timetable, no regulations;
- Sound management of resources, marketing and recognition of registered designation of origin (DOC);
- Teaching and culture (schools, associations);
- Change in network management (production, final user);
- Promotion of underused fishery species consumption, better protection of overused species;
- Lack of integrated studies on biodiversity.

ACTION 2 (indicators)

The selection of indicators has to be such to have a core set of indicators and guarantee the source of data in the concerned portion of the territory.

In tandem with the identification of stakeholders and the socio-economic analysis of the territory, a sharp selection of the existing sets of coast-related general and specific indicators was performed by evaluating the selection criteria and then debating them within forums and thematic workshops. At this phase, the need was felt to prepare a tool that could be not only a data base of the state of the art of knowledge, but also capable of representing the data and possible future scenarios in a simple way: the GIS as a tool not only to represent the reality but also to model the territory and create scenarios.

Then a selection of thematisms was assumed to represent and analyse criticalities resulting from thematic workshops. The flexibility of this tool has allowed highlighting some aspects related to the nature of the territory but also to its historical, economic and social development; these representations alone would be enough to allow an expert public to assess the values and criticalities of the coast. Nevertheless, the objective of the project is more ambitious than that: knowledge-sharing with all stakeholders in order to implement policies that are fully understood and strongly desired by

as many people as possible. That's why an “Atlas of Trieste Coast” was made. This was a way to tell the investigated area at various levels (the more you know the more you interpret) highlighting the criticalities resulting from the workshop but also representing, through scientifically validated indicators, the sensitivity and the value of the coast. The realization of such a work would have not been possible without the institutional support of the Friuli-Venezia Giulia regional government that was among the first to prepare thematic maps of habitats and land mosaics; the relationship with the *Centro di Eccellenza per la Ricerca in Telegeomatica* (Department of Biology - University of Trieste), jointly with the working group, allowed to collect and process all the data required for developing the Atlas.

The performed thematisms:

- Geographic set (orthophotos, toponyms, drawing of the coast from the sea, and landmarks);
- Geological map / sedimentological (CARG 1:5.000 + adriblu);
- Physical map (hydrography / basins /aspect / bathymetry / dem);
- Map of the landscape historical evolution (Moland) (Fig 2);
- Map of biodiversity (Mapping of habitats);
- Map of protected areas (CIS, SPZ, Reserves, PMA);
- Land planning map (General Town-planning Scheme mosaics);
- Map of tourist uses (trails/cycle lanes/diving points/public and private lavatories, etc. / ports and pleasure boating);
- Maps of environmental value assessment, sensitivity, anthropogenic pressure and fragility according to the protocol of *Carta della Natura* (Fig 3);
- Maps of constraints (mussel farming/ detailed maps, and so forth);
- Map of winds and currents (prevailing/wind forcing);
- Map of chemical-physical seasonality (temperature/salinity);
- Map of environmental pressures (Inhabitant equivalent/wastes/fires/electromagnetic plants/ suitability for swimming);
- Map of sighting of allochthonous species (meridionalization/tropicalization);
- Map of fishery (catches value index/fishing effort).

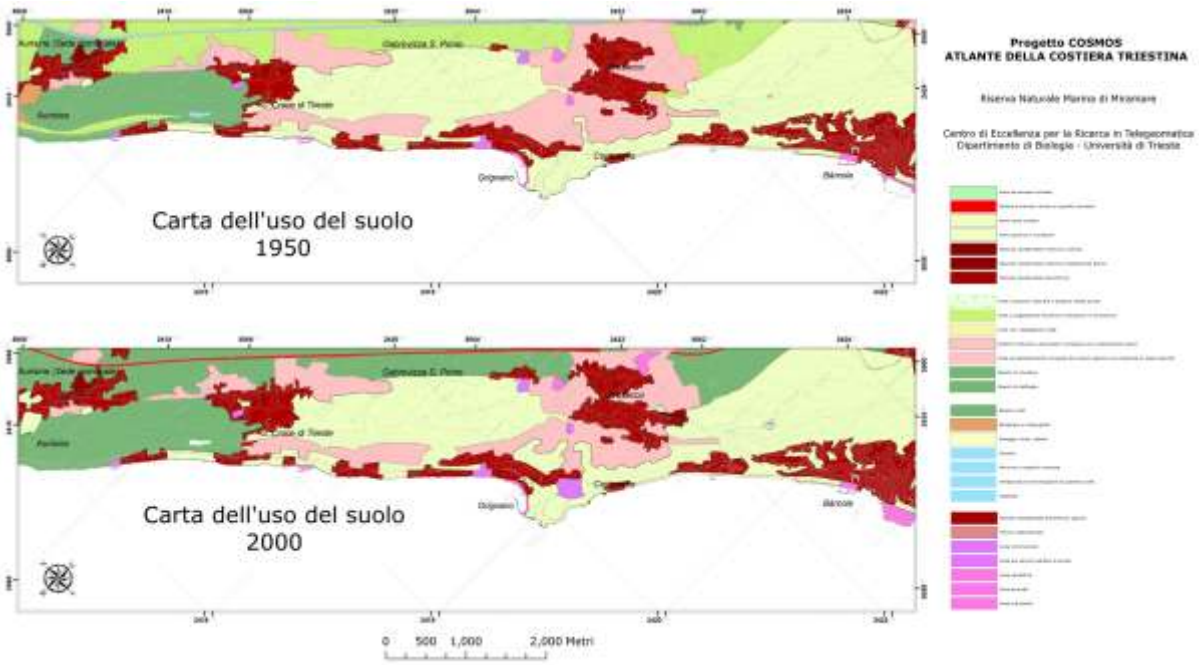

Fig. 2. Moland Land use map from 1950 through 2000

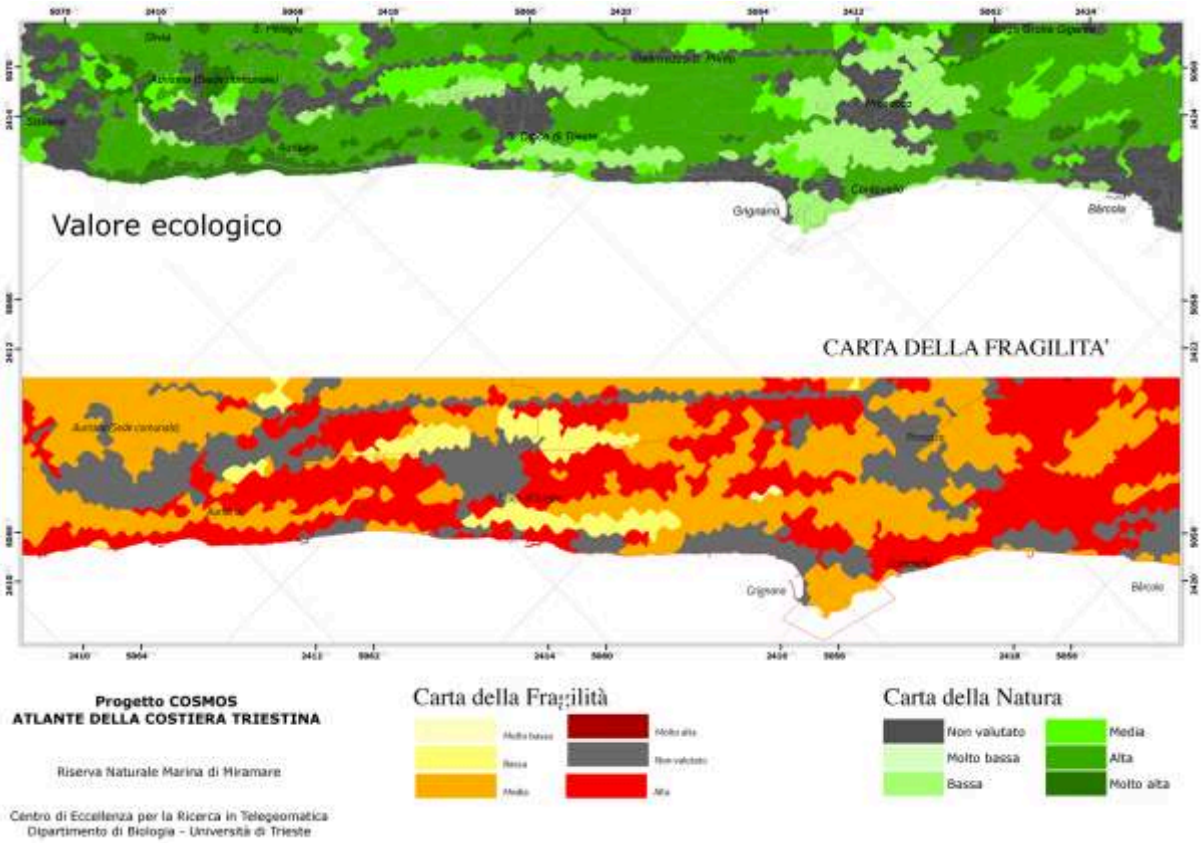

Fig. 3. Carta della Natura (Sensitivity and Fragility)

CONCLUSIONS

The project yielded two remarkable achievements: i) a data base/set of indicators and ii) the experience of a Marine Protected Area (MPA) as a driving force for a pathway of knowledge and integrated management of the territory.

Undoubtedly, the work carried out to identify priorities and the criticalities the territory is “aware” of, is the first step to formulate the guidelines and the best practices required for sustainable and participatory development. Returning this result to the citizens and to public administration in the form of an Atlas is an optimal decision support tool because it takes into account the objective evidence but also the reality as perceived by stakeholders. Of equally great value is the evidence from thematic workshops: the separation between the territory and the public authorities is a process that can hardly be stopped in the absence of mutual interest in pursuing continuous dialogue; continuity over time is, perhaps, the element that most failed. This is a gap we hope to fill in future through the subsequent steps of the project.

The project also highlighted strengths and weaknesses of participatory approaches; one of the numerous strengths is the acquired stakeholders' awareness of the value of their territory, which is too often belittled. We cannot deny that attempting to reconcile visions, knowledge and interests as disparate as the ones we analysed is often a quite onerous task.

As for the experience of the Marine Reserve we feel it has crowned a twenty-year long work. On one hand, the reserve has historically contributed, through its work, to increase knowledge and preserve biodiversity, in its new capacity as promoter of shared policies extended to the neighbouring territories, on the other hand, it has ascertained that the territory is ready to implement sustainable management themes provided they are motivated and shared. The same as for other previous experiences, the reserve offered itself as an experimentation laboratory for new management approaches. Namely, a laboratory ready to export virtuous models not only to its region but to the whole country as well.

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HIERARCHICAL SCALING OF BIODIVERSITY IN LAGOON ECOSYSTEMS

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ABSTRACT

Lagoons are habitat islands in the coastal landscapes characterised by both among ecosystems heterogeneity, due to different terrestrial-freshwater, freshwater-marine interfaces, and within ecosystem heterogeneity, due patchy spatial and temporal distribution of biotic and abiotic components.

Here, we investigate to what extent biodiversity in lagoon ecosystems is affected by these different sources of heterogeneity and which are the implication of the different sources for biodiversity management at the local scale of each single lagoon. To this aim, we focused on benthic macro-invertebrates using two sources of data: literature data on a sample of 26 Italian lagoons, and synoptically collected data on a sample of 10 lagoons in Eastern Mediterranean and Black Sea. The first data set allowed inference on the among ecosystem heterogeneity and the second on the within ecosystem heterogeneity at the scale of habitat type. Therefore, a hierarchical scaling of biodiversity in lagoon ecosystem is globally addressed.

Results show that the largest component of biodiversity in lagoon ecosystems is due to the differences among ecosystems. Dissimilarity among the taxonomic composition of macro-invertebrate guilds of the Italian lagoons was close to 90%. Difference in habitat type within lagoon ecosystems also affect biodiversity but less than among ecosystem differences; average dissimilarity among habitat types at the ecosystem level was 66.4±10.6 and within habitat types 49.67±6.0.

The analysis suggest that most of biodiversity on benthic macro-invertebrate guilds in the Mediterranean and Black Sea is maintained at the Ecoregional scale, being realised only at a small extent at every local ecosystems. This finding stress the importance of a transnational governance of coastal ecosystem health in order to preserve biodiversity at any local scale within the EcoRegion. A role of land use management in lagoon watersheds was also emphasised and scaled up with respect to biological interactions acting at the very local scale.

INTRODUCTION

Transitional waters, which can be defined as *"bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows*" (EU-WFD 60/2000), are habitat islands in the coastal landscape. Transitional waters include a number of different habitat types: *i.e.* estuaries, deltas, lagoons, coastal lakes and ponds, brackish wetlands and salt-marshes. Enclosed bays receiving freshwater inflows and salterns can also be considered transitional waters.

As habitat islands along the coastal landscape, lagoons have their biotic structure forced by immigration and emigration processes, which are characteristics island biogeography forces, habitat selectivity (Zobel, 1997) and coexistence relationships (Tilman, 2004).

As habitat islands, lagoons are also ecotones among freshwater, marine and terrestrial biotopes, which abiotic structure is therefore forced by coastal geomorphological processes, hydrological processes, natural vegetation and land use in the watershed (Carrada *et al*., 1988; Rossi and Costantini, 2000).

Due to their origin as ecotones lagoons are heterogeneous ecosystems with strong threshold of variation which were already expressed as confinement gradients (Guelorget and Perthuisot, 1983) or ergoclines (Legendre and Demers, 1993) both within and among ecosystems.

Finally, due their origin as ecotones and to their geographic position along the coast, lagoons are ecosystems frequently stressed by different sources of anthropogenic pressures, such as eutrophication, chemical pollution, overfishing and clam farming, land reclamation and wrong management actions.

Community and guild structure are known to be shaped by processes occurring at very different spatial and temporal scale: from speciation events and biogeography, to biotic small scale interactions, through diffusion processes and abiotic filtering (Zobel, 1997).

Lagoons represent ideal study cases to evaluate the relevance of different potential drivers of community and guild structure at the local, ecosystem, level. On the one hand, they are known to be harsh ecosystems for both plants and animal guilds due to their strong gradients of salinity, temperature and dissolved oxygen in space and time. High flushing rates and high heterogeneity of deposition and erosion processes were additional limiting factors for many species. According to these two features, niche filtering can be expected to be very relevant in lagoon ecosystems, selecting very similar species according to few well known traits among which osmoregulation, resistance to hypoxia, temperature variability adaptation are the most studied. On the other hand, since physiographic and hydrologic factors are well know to differentiate lagoons into classes and to differentiate lagoon areas into habitat type according to **geomorphology** (Kjerfve, 1994), salinity (Battaglia, 1959) and degree of confinement (Guelorget and Perthuisot, 1983), a strong niche filtering could also be expected to result into some degree of heterogeneity of species composition both among lagoon and among the habitat types occurring in every lagoon. Moreover, at the ecosystem level tend to be characterised by relatively species-poor local guilds across a range of groups including micro-organisms, phytoplankton (Sabetta *et al*., 2008), benthic macroinvertebrates (Sabetta *et al*., 2007) and fish (Perez-Ruzafa *et al*., 2007), while at Eco-regional level an high diversity was recently observed for the macro-invertebrate guilds of a representative sample of Italian lagoons (Basset *et al*., 2007). However, the relative roles of factors determining homogeneity or heterogeneity of lagoon guilds and explaining the controversial evidences on local and ecoregional diversity of benthic macro-invertebrate guilds are still poorly investigated.

Here, we have analysed the taxonomic composition of macro-invertebrate of Mediterranean lagoons searching for general patterns of guild composition according to abiotic (habitat) and biotic (species interactions) constraints. The analysis had two major aims: to evaluate components of Mediterranean lagoon biodiversity, in terms of among lagoon, among habitat, within habitat, biodiversity; and, to explore implications of a hierarchical scaling of macro-invertebrate biodiversity on the management and governance of biodiversity conservation at the local ecosystem scale. In fact, the local scale is the scale at which environmental issues are most commonly posed and at which socio-economic components of conservation are raised by local people.

To these aim, we focused on benthic macro-invertebrates using two sources of data: literature data on a sample of 26 Italian lagoons (hereafter, Italian lagoon data-base) and synoptically collected data on a sample of 10 lagoons in Eastern Mediterranean and Black Sea (hereafter, Mediterranean/Black Sea data-base). The first data set allowed inference on the among ecosystem heterogeneity and the second on the within ecosystem heterogeneity at the scale of habitat type. Therefore, a hierarchical scaling of biodiversity in lagoon ecosystem is globally addressed. Many published papers are based on these two data-bases (Basset et al., 2006; Basset et al., 2007; Sabetta et al., 2007; Basset et al., 2008) but they were not yet used to explore the potential scaling effects which are addressed in this study.

MATERIALS AND METHODS

Italian lagoon data-base

The data used in the present study were gleaned from published sources, including international journals retrieved from electronic databases (i.e., *ASFA*, *WebSpirs*, *Biological Abstracts, Current Contents e Zoological Records),* Italian journals covering the fields of ecology and zoology (i.e., *Accademia Peloritana, Il naturalista siciliano, Oebalia, Rendiconti del Seminario della Facotà di Scienze dell'Università di Cagliari, Thalassia Salentina*) and proceedings of Italian scientific societies covering the field of aquatic ecology and zoology (i.e., *Associazione Italiana di Oceanografia e Limnologia, Società Italiana di Biologia Marina, Società Italiana di Ecologia, Società Sarda di Scienze Naturali*). The search was restricted to papers published in the last 25 years.

The electronic search was performed through a three-way factorial combination of the following groups of keywords: a) Italy, Italian; b) lagoon, coastal lake, coastal pond, saltmarsh, saltern, brackish; c) benthos, macrobenthos, macroinvertebrate, benthic invertebrates, benthic fauna.

Paper retrieved were further screened according to three main criteria: a) taxonomic resolution (most taxa classified down to the genus or species level); b) taxonomic completeness (the taxonomic list of a lagoon, resulting from one or more papers, cannot be limited to a few selected phyla); c) sampling design (samplings carried out at a seasonal or higher resolution). Finally, 169 papers were selected for the analysis, referring to 26 lagoon ecosystems. A list of the considered ecosystems, reporting some key structural abiotic feature of every of them is presented in Table 1. In the dataset obtained by applying these criteria, the number of articles referring to each of the 26 transitional aquatic ecosystems ranges from 1 (i.e. Massaciuccoli coastal lake, Torre Guaceto brackish wetland, Marsala saltern and Piallassa Baiona lagoon) to 22 (i.e. Venice lagoon).

Table 1. Main structural abiotic features of the 26 lagoons considered for the study from the Italian lagoon data-base

Lagoon		Abiotic factors								
ID	Name	A	B	C	D	E	F	G	H	I
1	Grado Marano	160	2	2	485,0	2732,6	0,596	17,05	27,5	15,85
2	Venezia	549	2	1,5	1635,0	8992,5	0,576	26,3	19,4	22,5
3	Sacca Canarin	8,9	1,5	1	365,0	871,6	0,411	14,5	29	14,9
4	Scardovari	38	1,3	1,5	318,0	1011,9	0,411	18,65	29,3	14
5	Nazioni	1	2,1	2	2655,2	8,3	0,411	25	12	16,65
6	Goro	32	1,6	1,5	483,0	1705,1	0,411	21,75	26,3	16,2
7	Comacchio	115	1,2	0,8	441,1	286,7	0,411	23,1	26,2	16
8	Pialassa Baiona	11,8	1,4	0,8	1984,5	132,3	0,411	23	26	16,5
9	Massaciuccoli	7	1,6	3	4276,0	117,2	0,204	8,7	14,6	17,5
10	Orbetello	25,5	2,3	1	1838,0	92,9	0,234	34,35	15,5	17,3
11	Lesina	51	2	0,8	985,0	34,0	0,156	22,5	23	16,5
12	Varano	64	1,2	4	450,1	30,0	0,156	24,86	26,2	19,15
13	Fogliano	4	1,8	0,9	356,0	57,0	0,261	33	30	20
14	Monaci	0,95	1	0,8	818,4	27,3	0,261	27,5	21	19
15	Caprolace	2,3	1	1	974,0	23,6	0,261	41,5	17	20
16	Sabaudia	3,7	3,9	4	980,0	15,2	0,261	22,25	21,5	16,2
17	Fondi	3,9	3,9	9	2349,5	76,9	0,261	20	14	19
18	Lungo	0,47	1,3	4	213,6	17,1	0,261	20	26	20,5
19	Fusaro	1	1,2	3	630,3	39,4	0,246	37,15	8,7	18,65
20	Torre Guaceto	1,2	1,6	0,4	10,0	0,4	0,195	19	28	16
21	Acquatina	0,45	2,94	1	66,8	267,1	0,195	25	30	18
22	Alimini	1,37	2,29	1,5	146,7	19,6	0,195	29	22	19
23	Oliveri-Tindari	0,19	2,7	3	0,0	0,0	0,124	25,5	21	21,15
24	Saline di Marsala	0,89	1,4	0,6	0,0	0,0	0,156	55	30	21
25	Stagnone Marsala	24	1,8	1	314,0	1794,6	0,156	39,3	12,4	19,77
26	Rada di Augusta	23,5	1,4	14,9	235,0	1512,7	0,187	38,15	0,1	24,77

A= surface (km2); **B=** sinuosity; **C=** mean depth (m); **D=** length outlet (m); **E=** width outlet (m); **F=** tidal range (m); **G=** mean salinity (PSU); **H=** range of salinity (PSU); **I=** mean water temperature (°C)

For each lagoon fifteen physiographic and hydrological parameters were collected from the published papers as well as from published satellite images and from the “Tide tables of Italy” (Istituto Idrografico della Marina, Genova, 1999). The parameters are measures of surface area, perimeter and sinuosity of the water body, maximum axis and minimum axis, measures of length and width of its outlet(s) and their ratio (length/width), measures of mean depth, maximum and minimum tide, tidal range, maximum and minimum salinity and salinity range.

Data were organized into two matrices, a presence/absence matrix with benthic macroinvertebrate data was organized into 26 columns (i.e., the selected lagoons) and 944 rows (i.e., macroinvertebrate taxa); and a rectangular matrix with 26 rows (i.e., the selected lagoons) and 17 columns, with two columns describing the benthic macroinvertebrate guilds (i.e., taxonomic richness and standard body length of the largest species), nine columns describing physiographic characteristics of the water bodies (i.e., surface area, perimeter, sinuosity, length of min. axis, length of max. axis, outlet length, outlet width, outlet length/width ratio, average water depth), and three columns each describing the tidal regime (i.e., minimum and maximum tides and tidal range) and the salinity regime (i.e., minimum, maximum and range of salinity).

Multiple regression was used to evaluate the relative influence and the cumulative importance of surface area and other abiotic structural factors to macro-invertebrate taxonomic richness in the studied Italian lagoons. The taxonomic composition similarity between lagoon pairs was measured using the Jaccard similarity index.

Mediterranean/Black Sea data-base

Data on benthic macro-invertebrates colonizing different habitat types within lagoon ecosystems were originally collected in 10 transitional water ecosystems, located in 4 different countries (from West to East: Italy, Albania, Greece and Romania), as a part of the INTERREG IIIB Project known as TWReferenceNET. The ecosystems studied included micro- and non-tidal lagoons (following Basset *et al*., 2006) salt pans and almost freshwater coastal wetlands (Table 2).

Table 2. Main structural abiotic features of the 10 lagoons considered for the study from the Mediterranean/Black Sea data-base

Site	Surface area (km^2)	Tidal range (m)	T °C	Salinity PPM	Dissolved oxygen mg/L	DIN µM	DIP µM	Organic matter %
Agiasma	3.20	0.50	23.71 *±4.12*	27.74 *± 4 08*	7.13 *± 1 87*	5.62 *± 1 00*	1.92 *± 1 49*	2.15 *± 0 88*
Alimini	1.40	0.19	16.29 *± 1.73*	28.67 *± 2 63*	7.89 *± 0 79*	50.55 *± 8 48*	0.07 *± 0 01*	10.04 *± 8 54*
Cesine	0.70	0.15	17.28 *± 2.96*	5.45 *± 0.75*	8.69 *± 1.09*	3.29 *± 0.99*	0.11 *± 0.04*	15.38 *± 18.97*
Grado Marano	142.00	0.65	16.78 *± 6.65*	23.47 *± 4.65*	8.51 *± 1.55*	59.38 *± 11.47*	0.10 *± 0.04*	1.06 *± 0.46*
Karavasta	45.00	0.20	10.89 ± 3.15	42.20 *± 8.28*	9.59 *± 1.47*	19.28 *± 6.60*	0.09 *± 0.02*	11.03 *± 3.07*
Leahova	22.90	0.15	18.53 ± 0.85	0.20 *± 0.01*	8.30 *± 2.17*	18.08 *± 1.11*	0.14 *± 0.09*	3.63 *± 2.60*
Margherita di Savoia	12.00*	0.10	16.76 ± 4.95	60.98 ± 15.76	6.43 *± 2.46*	38.86 *± 32.91*	5.52 *±11.65*	13.48 *± 4.06*
Patok	7.10	0.30	12.27 ± 3.55	30.57 *± 5.31*	9.38 *± 1.46*	17.74 *± 6.26*	0.20 *± 0.01*	4.75 *± 3.23*
Sinoe	129.60	0.15	18.37 ± 0.74	0.22 *± 0.04*	8.83 *± 1.09*	16.63 *± 1.16*	0.12 *± 0.06*	2.69 *± 0.72*
Torre Guaceto	1.60	0.20	16.03 *± 4.21*	5.84 *± 0.84*	5.42 *± 2.51*	50.15 *± 44.15*	0.13 *± 0.08*	43.54 *± 29.86*

*The surface area of Margherita di Savoia reported here refers to areas not directly affected by productive uses.

A hierarchical sampling design was adopted to investigate the seasonal and spatial variation of macroinvertebrate community structure within each considered ecosystem. Sampling design was based on the identification of different habitat types within every ecosystem according to two factors: substrate type [rock (average particle size larger than 2mm), sand (average particle size in the range comprised between 2mm and 0.5mm, and mud (average particle size smaller than 0.5mm)] and presence/absence of vegetation as seaweeds, seagresses and emergent macrophytes. According to these two criteria 12 habitat types (hereafter HT) were potentially identified as follows: HT1 rock without vegetation, HT2 rock with seaweeds, HT3 rock with seagrasses, HT4 rock with emergent macrophytes, HT5 sand without vegetation, HT6 sand with seaweeds, HT7 sand with seagrasses, HT8 sand with emergent macrophytes, HT9 mud without vegetation, HT10 mud with seaweeds, HT11 mud with seagrasses, HT12 mud with emergent macrophytes. Not all twelve necessarily had to occur at every ecosystem or even in the overall sample of 10 ecosystems considered. In every ecosystems habitat types covering more than 25% of sediment surface were sampled and data were collected during Fall 2004 and Spring 2005, at 2 sampling stations for each habitat type in each ecosystem.

The samples were collected using a box-corer (0.03 m^2). For each sampling point five replicates were collected. Each sample was sieved through a 0,5 mm mesh sieve and stored in 4% formalin solution. Abiotic water parameters (i.e., dissolved oxygen, pH, water salinity and temperature) were monitored close to the bottom at each station during sampling activities at each site using a hand-held multi-probe meter (YSI 556). Samples of sediment from each sample site were collected for organic matter and heavy metal determination in the laboratory. Moreover, water samples were taken from the water column close to each station for the determination in laboratory of water nutrients (i.e., ammonium, nitrite, nitrate and phosphate) as inorganic dissolved concentrations with standard techniques.

In the laboratory, the collected benthic macro-invertebrates were sorted and selected under a stereomicroscope. Animals were later identified to species level where possible and counted.

RESULTS

Italian lagoon data-base - Overall, 944 taxa were reported to colonise the whole sample of lagoons considered in the data-base, nested into 343 families, 106 orders, 31 classes and 13 phyla. Mollusca, Anellida and Arthropoda were the three most represented phyla. Range size of the 944 taxa was extremely restricted. There were not taxa nor families recorded for all 26 lagoons. At the highest resolution, i.e., taxon level, more than 50% of taxa were recorded at a single lagoon and more than 95% of taxa were recorded at a maximum of 8 lagoons (Fig. 1). At the level of family, more than 50% of families were recorded at a maximum of 2 lagoons and more than 95% of families at a maximum of 16 lagoons (Fig. 1). Consequently, average similarity in the taxonomic composition of benthic macroinvertebrate guilds was low between lagoons at every level of taxonomic resolution considered, being 0.1050.008 at the taxon level (Fig. 2) and 0.2170.013 at the family level. Average similarity between lagoon pairs ranged from 0 to 0.345 at the taxon level, being the highest between the two spatially neighbouring Fogliano and Monaci lagoons; it ranged from 0 to 0.55 at the family level, being the highest between the two spatially neighbouring Goro and Sacca del Canarin lagoons. Spatially closed lagoons also had, on average, more similar taxonomic composition of macro-invertebrate guilds (Fig. 2). At the taxon level, most of Adriatic lagoons are grouped together, even though into two distinct groups including Pialassa Baiona, Sacca of Scardovari and Lago Nazioni, the former and Lake Alimini Grande, Lake Acquatina, Lake Varano, Lesina Lagoon, Valle of Comacchio, Sacca of Goro, Sacca of Canarin and Venice Lagoon, the latter; nevertheless, the similarity on the taxonomic composition of benthic macro-invertebrate guilds even between the closest ecosystems was never higher than 0.300 (highest value between Sacca of Goro and Valle of Comacchio). Similarly, most of the Central Tyrrenian lagoons are grouped together into two distinct groups, including Lake Fusaro and Lake Caprolace, the former and Lake Fondi, Lake Lungo, Lake Sabaudia, Lake Monaci and Lake Fogliano, the latter.

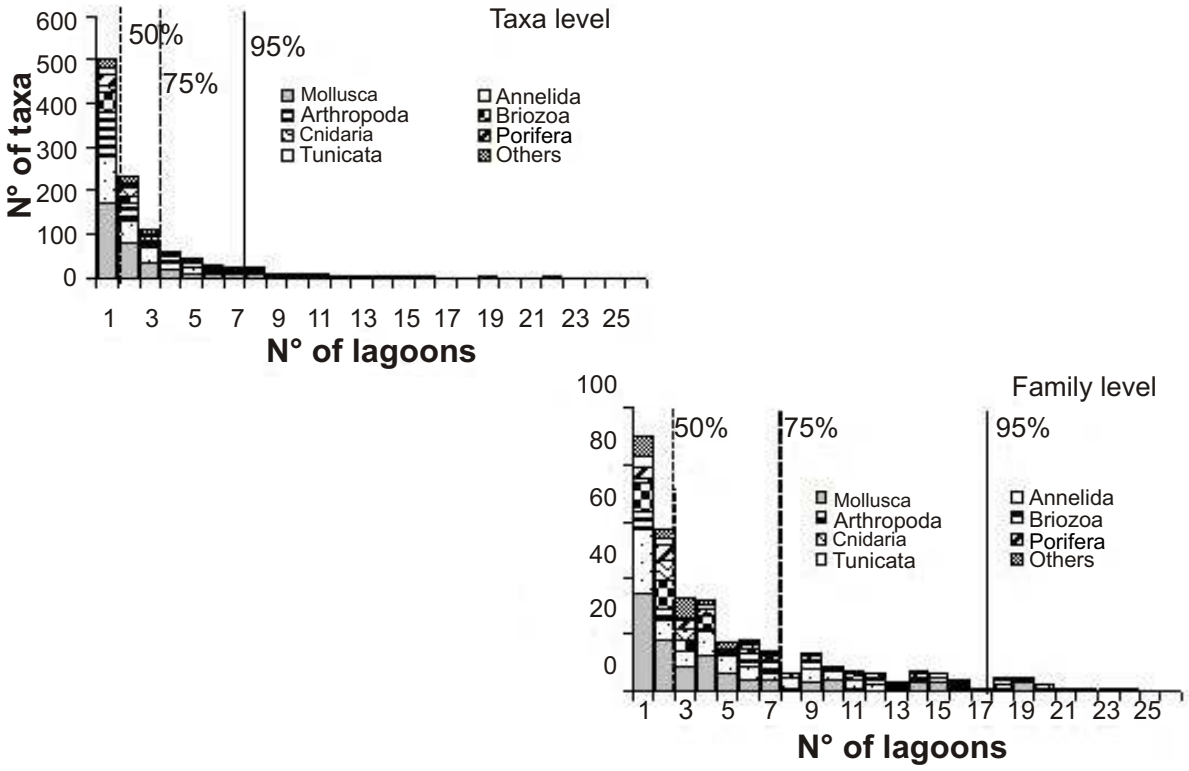

Fig. 1. Species range for the benthic macro-invertebrate taxa recorded in the literature in the sample of 26 Italian lagoons considered. Data for two levels of taxonomic resolution are shown: taxa (A) and family (B) levels. For each level, the species ranges of the 50th, 75th and 95th percentile of taxonomic richness are shown

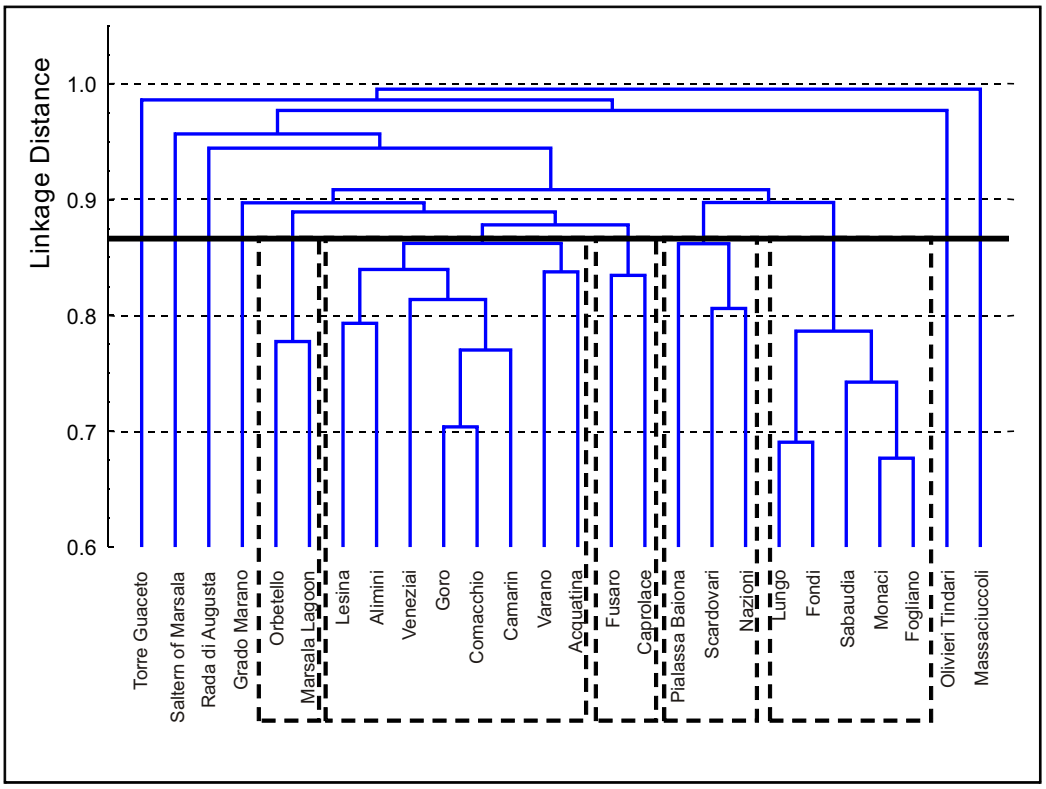

Fig. 2. Average similarity of benthic macro-invertebrate guilds of the selected sample of Italian lagoons. UPMGA clustering was shown and post-hoc statistical test of group separation was performed. Groups are emphasized by the dashed lines

Mediterranean/Black Sea data-base - Globally, out of the 12 potential habitat types only 7 were actually found to cover at least 25% of the sediment surface at one of more of the studied ecosystems. Therefore only 7 habitat types were sampled at one or more ecosystems; they include HT5, HT7, HT8, HT9, HT10, HT11, HT12. Substrate type with average particle size larger than 2mm was never found widespread at any ecosystem. Benthic invertebrate taxa showed a restricted range size also within ecosystems among typologies. 60.8% of sampled taxa were found specialized on a single habitat type, 25.9% were recorded from two habitat types and only the 0.5% of all taxa were collected from every habitat types. Consequently, differences among habitat types within lagoon ecosystems were also large; average dissimilarity among habitat types at the ecosystem level was 66.4±10.6 (Fig. 3) and within habitat types 49.67±6.0. Differences among habitat types varied greatly among ecosystems being as large as 90% at Grado-Marano and Torre Guaceto lagoons and less than 50% at Le Cesine lagoon. Habitat types were clearly differentiated at every ecosystem except than at Lake Alimini Grande where differences also among stations at the habitat type 8, send with emergent macrophytes (Fig. 4). However, at the other two habitat types dissimilarity between stations and among samplings at each station is on average lower than 30%, being 22.01%±1.66 at HT5 and 18.46%±1.42 at HT9 (Fig. 4).

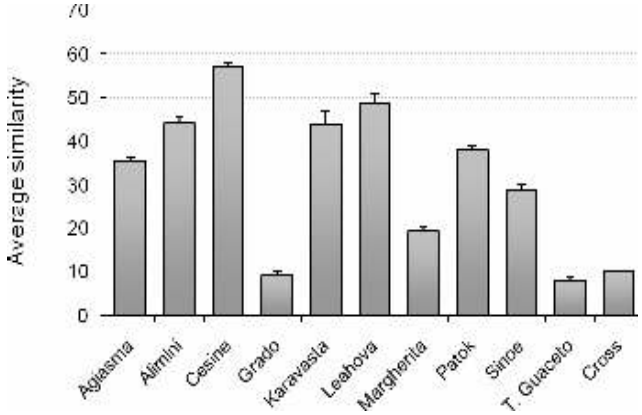

Fig. 3. Average similarity of benthic macro-invertebrate guilds at the ecosystem level for the set of 10 ecosystems considered in the Mediterranean/Black Sea data-base. Similarity is among habitat types and stations. Vertical bars represent ± 1 SE

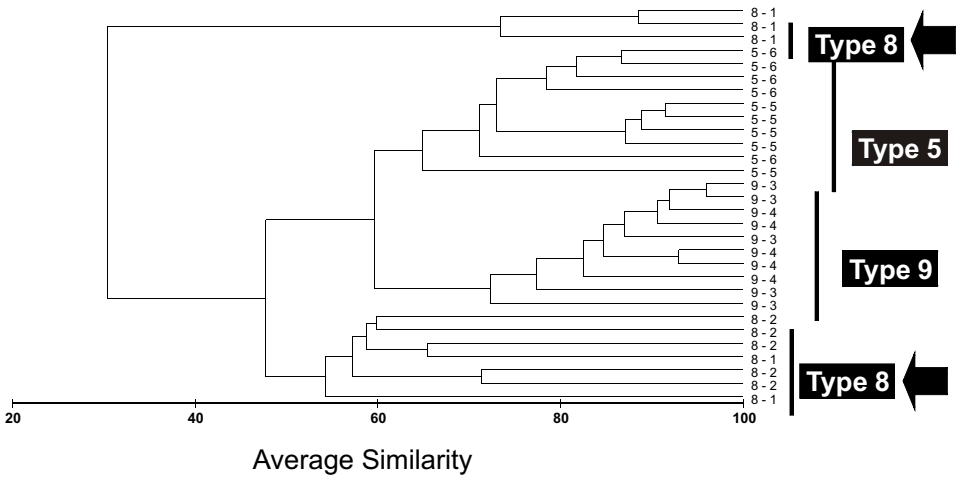

Fig. 4. Hierarchical partitioning of taxonomic similarity among habitat types in Lake Alimini Grande. The three habitat types are clearly differentiated but for one of them (HT8) distinctions between stations also occur

DISCUSSION

The results of this study emphasise a hierarchical scaling of biodiversity in lagoon ecosystems. Local taxonomic diversity of macro-invertebrate guild was regularly found reduced while spatial differences within every transitional water ecosystem among habitat types and spatial differences at a larger spatial scale among ecosystems lead to an high EcoRegional biodiversity of macro-invertebrate guilds.

In particular the results of this study emphasise that most of biodiversity in transitional water macro-invertebrate guilds is maintained at the EcoRegional level, as it is shown by the extremely high dissimilarity of taxonomic composition of macro-invertebrate guilds among lagoons.

A large heterogeneity of taxonomic composition of macro-invertebrates in Italian lagoons was already shown (Basset *et al*., 2007). In principle, the diversity of macro-invertebrate guilds could result from stochastic ecological and evolutionary processes on the local (e.g., community level) and regional (e.g., meta-community level) scale, or from dispersal and recruitment limitations on macro-invertebrate taxa, or from the structural heterogeneity of the transitional waters (Basset *et al*., 2006) and the consequent selection of macro-invertebrate taxa according to their functional traits and niche requirements.

Decoding taxonomic heterogeneity of macro-invertebrate guilds into mechanisms of community assembly has already been addressed elsewhere (Basset *et al*., 2007). Here, we want to focus on the implications of this finding for the governance of lagoon biodiversity. The large among ecosystem component of macro-invertebrate biodiversity outline the need of a co-ordinated governance at the EcoRegional level; governance at a lower, more restricted, spatial scale is not going to be effective on the process of biological conservation of lagoon integrity. In the Adriatic basin, where differences between North and South, West and East regions in term of socio-economic development and conservation effort, the need for an EcoRegional scale governance is even stronger in order to prevent on the Eastern and Southern coasts the same mistakes that were done in the past on the Northern and Western coasts. Due to the reduced redundancy in the macro-invertebrate fauna of different lagoons, local loss of biodiversity are likely to expand their influence at the entire EcoRegional scale threatening biodiversity even at local and protected ecosystems. In other words, conservation of biodiversity cannot be managed locally but requires a large scale, EcoRegional, process of governance.

The second relevant point raised by this paper is the quantification of internal patchiness of benthic macro-invertebrate guilds in lagoon ecosystems as related to habitat types. Changes in salinity, water level and oxygen concentration are known to be significant stresses which threaten taxonomic diversity in transitional water ecosystems (Guelorget and Perthuisot, 1983), determining low diversity within patches or within parameter levels along an environmental gradient (Chabrerie *et al*., 2001),

although the overall diversity may be high. Biodiversity in transitional water ecosystems was found to be severely threatened by pressures arising from human activities, such as eutrophication, chemical pollution and habitat loss or reduction of total area (Pérez-Ruzafa *et al*., 2007). Temporal variations in benthic macro-invertebrate communities associated with eutrophication phenomena have been the subject of numerous studies (e.g., Tagliapietra *et al*., 1998; Koutsoubas *et al*., 2000; Lardicci *et al*., 2001). Biodiversity in transitional water ecosystems was also found to be related directly to physiographic lagoon characteristic among which lagoon surface area (macro-invertebrate guilds, Basset *et al*., 2006) and lagoon volume (fish guilds, Perez-Ruzafa *et al*., 2007) seem to be the most important. The diversity/area diversity/volume found for different guilds were supposed to have a basis in the internal patchiness of lagoon ecosystems, which can be expected to be an increasing function of lagoon surface area and volume.

Therefore, the results reported here add some more to the existing knowledge. In fact, we showed that independently on existing gradients of salinity, water level and confinement, which were very likely to affect species composition of phytoplankton, seaweeds and sea grasses much more than the occurrence of seaweeds and, particularly, sea grass meadows, the internal patchiness into simple habitat type strongly affect taxonomic distribution of benthic macro-invertebrates and species diversity patterns. The selected habitat types actually respond to pressures, such as eutrophication, but they are strongly affected by the hydrology of the lagoon ecosystem and by the land use in the lagoon watershed. These two factors, directly dependent on human activities at the landscape level are likely to affect both the substrate conditions, determining the spatial distribution and the occurrence of erosion and depositional areas through qualitative and quantitative regulation of the freshwater flow, and the nutrient input to lagoon ecosystems, affecting the ecological succession of sea grasses, seaweeds and phytoplankton (Viaroli *et al*., 2008). The finding that, focusing on the local scale, biodiversity of benthic macro-invertebrates in lagoon ecosystems largely depends on the internal patchiness outline the relevance of the landscape scale for the management of biodiversity within local lagoon ecosystems. Because of the effects of anthropogenic changes in land use and hydrologic water regime on the submerged landscape in lagoon ecosystems, determining the occurrence and extension of habitat patches, the watershed landscape scale management and the submerged landscape patchiness are strictly related.

In conclusion, the results of this study stress that addressing biodiversity conservation in lagoon ecosystems simply controlling chemical pollution at the local scale may be completely un-effective and is generally not adequate. Biodiversity in macro-invertebrate guilds is related to a hierarchical scaling of processes going from the local scale interaction with abiotic factors, including pollutants, and species interactions to a watershed scale, affecting habitat patchiness to an EcoRegional scale, determining the potential flux of immigrants on which local diversity seems to be based. Therefore, bottom up control of pollution pressures and landscape management have to be joined to EcoRegional scale governance of coastal land use and aquatic resource in order to achieve an actual conservation policy for these invaluable coastal landscape patches. In a closed basin, as the Adriatic Sea actually is, almost resembling an transnational internal salty lake, transnational governance of land use and aquatic resource is the only possible way to face with the actual problems and to prevent future threats potentially arising from the socio-economic development expected on the Adriatic coasts.

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INTEGRATED COASTAL ZONE MANAGEMENT (ICZM) IN GREECE

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The presentation focuses on the Coastal Zones management in Greece in a two-fold approach: it refers briefly on the one hand to the state of coastal zones and on the other to the policies in place or under preparation. There is also a link made with the international context, in particular the European Community and the Mediterranean related policies. Finally, a few points are raised for further consideration.

THE STATE OF THE GREEK COASTAL ZONES

Following the CORINE method of measurement, Greece has a coastline of 18.500 km long, which corresponds to more than one third of the Mediterranean coastline and more than one fourth of the European Community one. Half of this coastline corresponds to the approximately 3.000 islands of the country. A 70% of the coast is rocky, which means that there is no significant human pressure on this part. Along the coasts one can find 85% of the population, most of the big urban centers, 80% of the industrial activities, 90% of tourism and 35% of agriculture.

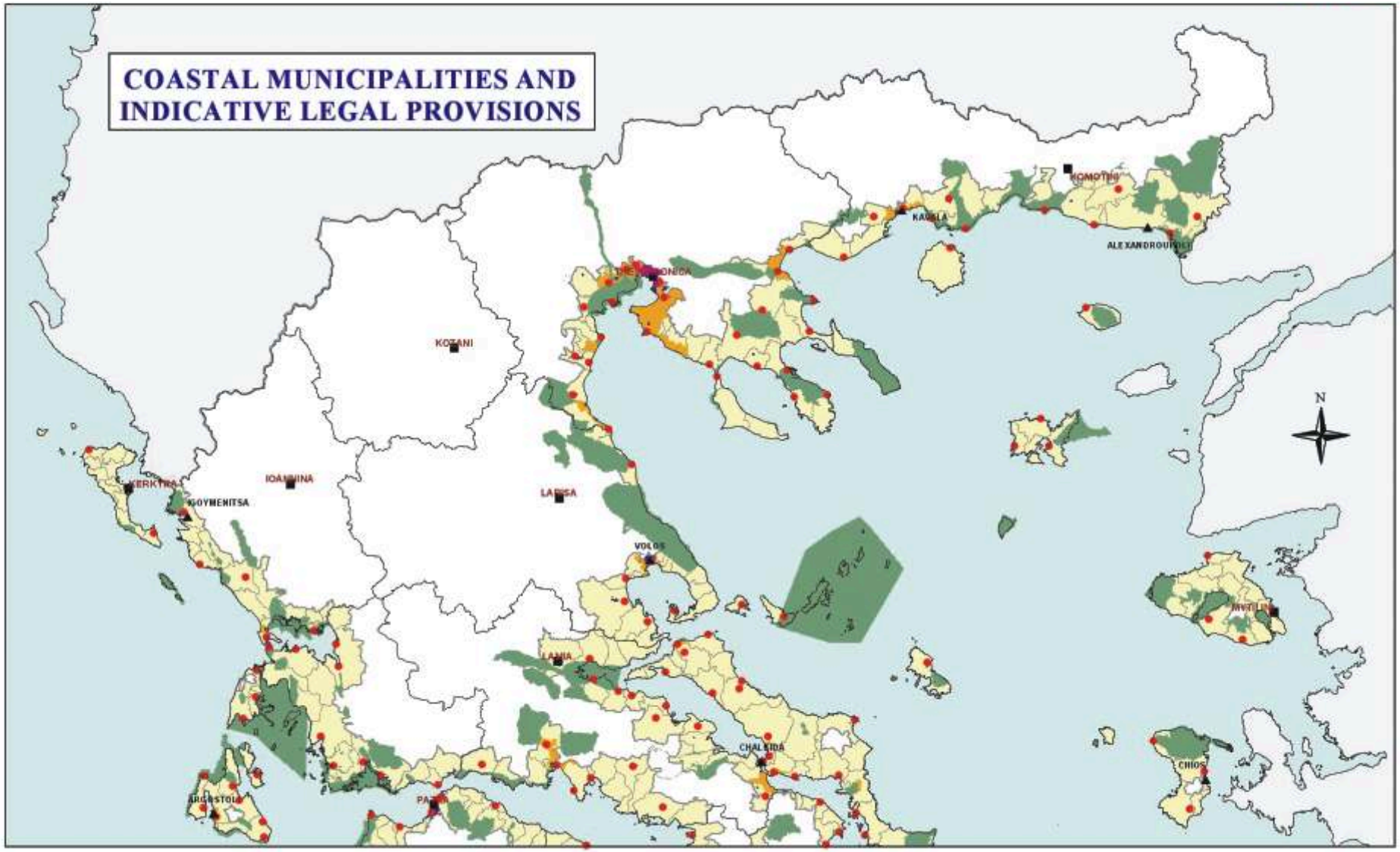
In spite of this high concentration of people and activities, many indicators show that all in all the quality of the Greek coasts is very good. 99.9% of the samples in bathing waters comply with the EU acceptable values and this thanks to considerable investments in water treatment. For many years, Greece is the first or the second best as regards Blue Flags in 2006 it received 411 Blue Flags coming second (after Spain) in rank. Greece has only a 1.31% of built-up coasts, the smallest within the EC. However, there is a high percentage of erosion risk, 28.6% of the coastline being already eroded.

One should add to the above the very rich coastal and marine biodiversity and the beautiful coastal landscapes, that turn the coastal zones into areas of high attraction. Almost half of the NATURA areas are coastal, while there are two marine parks (see Fig. 1).

Furthermore, it must be underlined that, because of Greece's unique geographical features, the country's territorial and social cohesion depends directly on the existence of frequent and reliable coastal shipping services, which annually perform an extraordinary work of serving 94 islands, 144 ports and 36,000,000 passengers.

All these do not mean, of course, that the situation is idyllic - some pollution problems occur in some cases, but these are of a local nature and limited in numbers. The bigger problems identified in the Greek coastal zones are: erosion, expansion of building mostly because of tourism and secondary summer houses, water scarcity accentuated by inappropriate demand management, lack of appropriate waste treatment and weak coordination among different authorities.

Currently, the Ministry (through the Physical Planning services) is carrying out a mapping of the indicators identified within the EC as important to evaluate sustainable development of coastal zones, in order to complete the picture of the existing situation and to better cover the gaps and justify actions to be taken.


COASTAL MUNICIPALITIES AND
INDICATIVE LEGAL PROVISIONS
KOMOTINI
KAVALA
ALEXANDROUPOLI
KOZANI
IOANNINA
LARISSA
VOLOS
LAMIA
CHALKIDA
CHIOS
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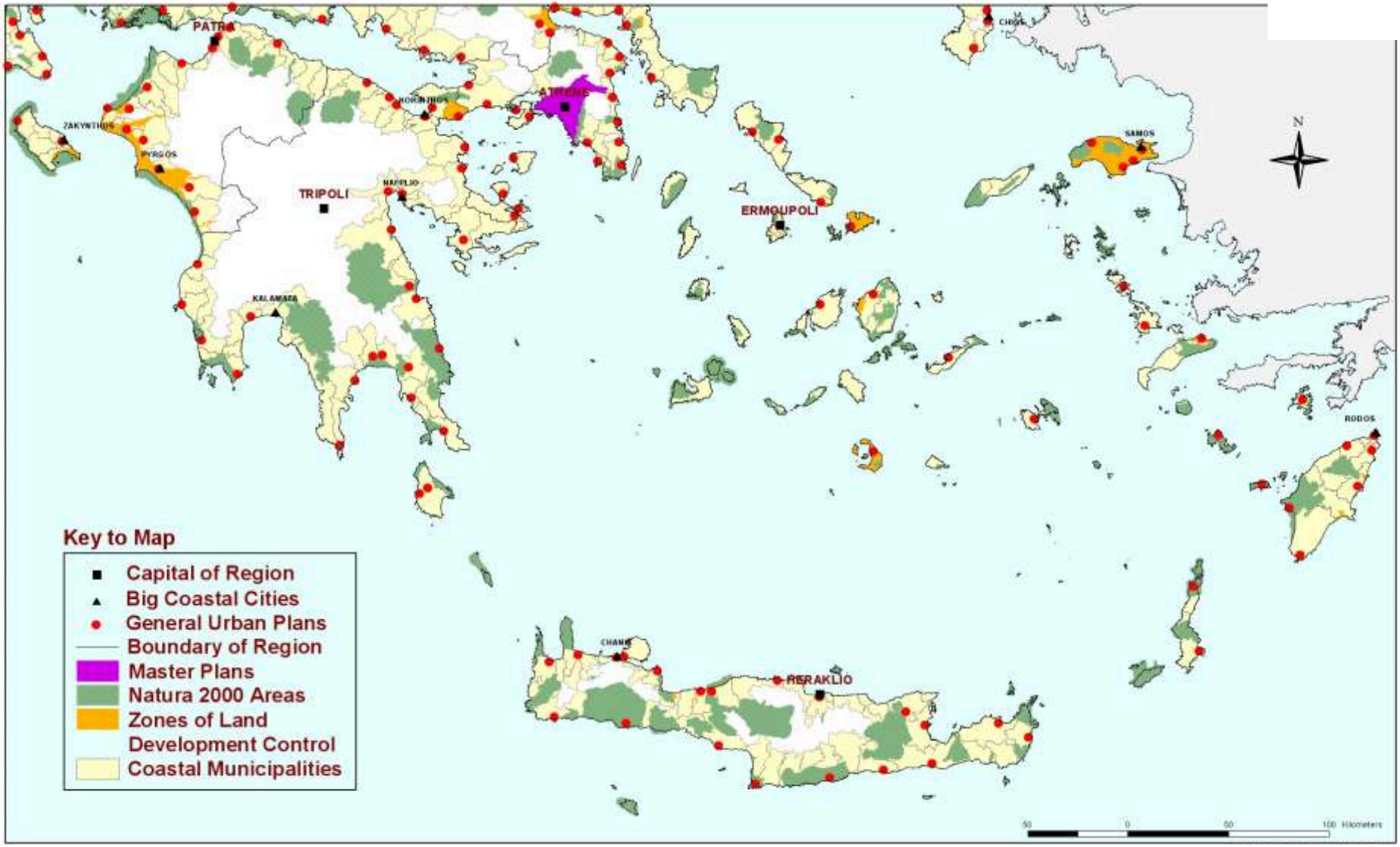

Fig. 1. Coastal municipalities and indicative legal provisions (Source: YPEHODE)

THE NATIONAL POLICIES

For obvious reasons, Greece has demonstrated on many occasions a particular interest in the Integrated Coastal Zone Management (ICZM), since this could ensure the sustainable development not only of the coastal zones themselves, but also of the entire country. It is clear that taking concrete measures in an integrated and sustainable way for the coastal zones in Greece is a matter of high national priority and not a simple action of local or regional importance.

Furthermore, and given the great importance of coastal tourism for Greece, as well as the fact that the new trend in the market of tourism is related to quality and the natural and cultural environment of the destination, it becomes obvious that the rational management of coastal zones constitutes a condition for any successful tourism policy as well as for the sustainable development of the country.

Since the state of environmental quality in Greek coastal areas is very good as already mentioned, the objective of the current policies is to maintain the high standards and to reduce pressures. In the past, policies had a clearly sectoral and fragmentary nature. In the '90s emphasis was put on research and special plans, with major activities:

- a Research Project on Coastal Zone Management and Impacts of Tourism (1995),
- 6 pilot projects in the EC context (1996),
- a Project for Sustainable Development of Coastal Zones and Islands (1997-99),
- a Special Framework (= draft legal instrument) for Sustainable Development of Coastal Zones (2002). This was approved in 2003 by the national Council of Physical Planning and Sustainable Development, but procedures were never concluded for issuing the necessary legal act.
- The same period, procedures were launched for the management of the Natura 2000 protected areas. Among the 27 such broader protected areas with a Management Body are coastal.

The Special Framework for Coastal Zone Management that was drafted was not institutionalised pending the updating of the 12 Regional Spatial Plans (approved in 2003) and the outcome of the 4 new studies launched by the Ministry of Environment, Physical Planning and Public Works, currently at the final stage of consultations and mentioned below.

- The Global Framework for the National Spatial Plan
- The Special Framework for Spatial Planning of Industry
- The Special Framework for Spatial Planning of Renewable Energy, and
- The Special Framework for Spatial Planning of Tourism.

The current National Strategy is seeking for new elements of development and new opportunities, for implementation of management guidelines mostly through pilot actions and participation. A new Special Framework for ICZM is under preparation by the Ministry of Environment, Physical Planning and Public Works. It is based on the 2003 draft, experience gained since at national and international levels as well as the more specific orientations stemming from the 4 Spatial Plans (one Global and 3 Specific) mentioned above. Major elements of this new draft have been taken into consideration in proposals (related to objectives, actions and funding) to be included in the Operational Programme of Greece for 2007-2013. It is expected that this new national instrument for ICZM will be presented for public consultation in Spring 2008. In the meantime, the orientations of the 12 Regional Spatial Plans continue to be used as guiding criteria for any new proposal of investment or activity installation as well as for the corresponding Environmental Impact Assessments.

A number of questions emerge whenever such a legal-planning instrument is to be prepared for coastal zones:

- Should it give general guidance or regulate the land uses?
- Should it create new structures or use the existing ones and how?
- How could one combine in the most effective way the national, regional and local levels for planning and implementation?
- Should there be new provisions for land policy or not?
- Should there be rigid control mechanisms or not?
- Which should be the width of the non edificandi strip?
- Which would be the most appropriate ways for the involvement of stakeholders?

The draft Special Framework for ICZM under preparation is responding to these and many other similar questions taking account on the one hand of the reality and needs in the country and on the other of the existing Community and Mediterranean experience and commitments.

THE COMMUNITY CONTEXT

A huge part of the Community legislation can, obviously, apply to Coastal Zones as well. The thematic range of related Directives is really very broad: water quality, waste management, nature protection, floods, soil, marine environment, land based sources of pollution, and much more - not to mention the maritime policy under preparation.

However, the tool *par excellence* that is related directly to the coasts is the Community Recommendation 2002/413 on Integrated Coastal Zone Management. This Recommendation was the outcome of a number of demonstration projects launched by Member States (MS) in the '90s, a Commission Communication describing the situation, the needs and the proposals and the usual negotiation among Member States. The core of this Recommendation is its 8 principles which were expected to guide since all related plans in coastal zones within the EC. These **principles** could be summarized as follows:

1. Respect the interdependence between land and sea as well as the existing diversity.
2. Plan with a long-term perspective.
3. Provide for gradual management and adaptation.
4. Take full account of the natural processes and the absorption capacity.
5. Take into account the local characteristics and provide for flexibility.
6. Involve stakeholders in the planning and implementation processes.
7. Ensure compatibility of sectoral policies as well as coordination of administrations at national, regional and local levels.
8. Provide an appropriate combination of implementation means for regional cohesion.

In 2006 the Member States, including Greece, submitted to the European Commission their National Reports[1] on the implementation of the Recommendation since 2002. It was an excellent chance to get the full picture by country, to take stock of the positive steps, to identify gaps - existing in all countries in one or the other way - and to conclude on priorities for action to focus on in the future. The European Commission evaluated the implementation of the Recommendation on the basis of these Reports and additional available information, and submitted its evaluation to the European Parliament. As expected, the general conclusion was that progress was certainly made since 2002, but still there was much to be done. In most MS, weaknesses refer to a large extent to governance aspects.

During these last years, there was considerable work within the European Commission and in cooperation with the MS and the European Environment Agency, on Indicators for both: assessment of progress and sustainable development. On the basis of this collective work,

a. a table was prepared and used in consultations with stakeholders during the preparation of the National Reports and general assessment of progress made (2006), and
b. a core-set of 27 Indicators of Sustainable Development of Coastal Zones was agreed upon for use by the MS in the planning and monitoring processes.

One must also mention the current Community Operational Programme for the financial period 2007-2012 that gives to the MS the possibility to finance major activities contributing to the integrated management of Coastal Zones.

THE MEDITERRANEAN CONTEXT

The Mediterranean Action Plan (MAP) is the most important and successful Regional Seas Programme of UNEP. It was established in 1975, its headquarters are in Athens and it brings together 22 Contracting Parties (CP) - the riparian countries of the Mediterranean and the European Community. The legal basis of MAP consists of the Barcelona Convention against pollution in the Mediterranean and its attached Protocols. The Convention was signed in 1976 and amended in 1995 to extend its field of application to sustainable development of the Mediterranean coastal zone. Two among its 6 Protocols existing so far are closely related to coastal zone management: the one on Land-Based Sources and that on Specially Protected Areas of Mediterranean Interest. The scheme of cooperation is completed by a number of decentralised Regional Activity Centres (RACs) that develop thematic work linked to the provisions of the Convention and its Protocols.

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[1] For more details, the National Report of Greece can be found on the website of the Environment Ministry: www.minenv.gr

The Mediterranean Contracting Parties have showed strong interest in coastal zones from the beginning of their cooperation. Through the Priority Action Programme (PAP/RAC) based in Split, a number of Coastal Areas Management Plans (CAMPs) has been launched and carried out in many CP since the beginning of '80s. In fact, these CAMPs have been developed in three "generations", each one building on the experience of the previous one. In 1999, a Manual on CAMPs has been published by PAP/RAC, based on such good practices. In the course of 1995-2001, a number of PAP publications were issued in the same field covering Legislation, Guidelines, Good Practices etc.

In 2003, a Feasibility Study was carried out suggesting three alternative options for future legal action: a rigid regulatory legislation, general guidelines or - in between - a flexible legal framework. This latter was the option chosen by the Contracting Parties, an idea completely innovative at regional scale. A draft **Protocol on Integrated Coastal Zone Management** was prepared by PAP experts and then negotiated and amended by Technical and Legal Experts of the CP (2006-2007) at 5 special meetings to make it operational[2]. Its signature is considered as a major event for several reasons.

Some of the **major elements** reflected in the Protocol refer to the need for:

1. Compatibility and integration of sectoral policies applied, in order to contribute to sustainable development.
2. Ecosystems-based approach (mentioned also in the EC Recommendation).
3. Observing the interactions between land and sea, and ensuring a non-edificandi strip.
4. A minimum of common obligations.
5. Respect of the particular features of the Contracting Parties and ensuring the necessary flexibility to this end.
6. Coordination of all levels of authorities.
7. Involvement and cooperation of stakeholders.
8. A multidisciplinary approach and networking.

Some sensitive issues that had to be faced at the negotiation stage, but will also remain a challenge during the implementation, are the following:

1. How to identify common realistic commitments in so diverse conditions (e.g., the width of the non edificandi strip, where construction will be banned).
2. How to ensure flexibility without watering down the legal instrument (e.g., coordination structures, national legislation, exemptions).
3. How to promote new ideas and approaches in institutions with old mentalities (e.g., ecosystems and multidisciplinary approach, involvement of stakeholders, new economic/fiscal or technical or policy tools, decision support systems).

POINTS FOR CONSIDERATION

The major **problems** identified as regards the coastal zones over these years are:

- Continuation of building up along the coasts, often in a scattered way without proper planning. Pressure is put mostly on the 30% of the coastline.
- Weakness of basic tools, like Land Policy, Cadastre and Monitoring/Control Mechanisms.
- Difficulties in coordination, bureaucracy and conservative mentalities.
- Weak participation procedures.
- Insufficient communication between scientists and decision-makers.
- Difficulties in retaining populations in remote areas in order to ensure regional cohesion, as well as in developing and managing activities in such areas while protecting the environment at the same time.
- Not sufficient human and financial resources, which is an additional reason calling for setting out priorities and, preferably, for acceptable ones by those concerned.

If proper ICZM is in place, some of the major **benefits** expected are the following:

- Protection of nature and of resources necessary for development, thus contributing to sustainability.
- Complementarity of policies and funding, thus ensuring scale economies.

[2] This Protocol, the 7th of the Barcelona Convention, was finally signed on 21st January 2008 in Madrid, by 14 CP. The remaining 7 countries and the EC will sign as well as soon as they complete their internal administrative procedures, consensus having been achieved at the last experts meeting in December 2007 at Loutraki, Greece. The Protocol will enter into force after its ratification by 6 CP.

- Involvement of scientists, thus ensuring better justification of decisions.
- Consensus procedures with involvement of all stakeholders, thus facilitating implementation.
- Clear rules of the game, thus offering balance and an atmosphere of safety for investments.
- Safeguarding areas for free access and recreation of citizens, thus contributing to a better quality of life.

Experience shows that there is **further action** needed in particular as follows:

- To further study and understand the complexity in coastal zones.
- To start work towards changing mentalities, promoting integration and sustainability through experience on the spot (pilot projects).
- To promote timely awareness - addressing decision-makers, scientists and stakeholders - on sensitivities, needs, difficulties, possibilities, good practices etc.
- Make the best out of the existing resources, mechanisms and policies and then reinforce or amend them, if appropriate.

Integrated Coastal Zone Management being in fact a necessary tool to ensure quality of life for more that 85% of the population in Greece, I do believe that emphasis of all sides should be put on how to implement it on the ground as soon as possible and in the most effective way. Any effort to this direction is a tangible way to translate the concept of sustainable development in tangible action, not only for future generations but also for the present ones.

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INTEGRATED COASTAL ZONE MANAGEMENT (ICZM) IN TURKEY

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STATUS OF THE COASTAL AREAS

Turkey has the longest mainland coastline (appr. 8.333 km) and a wide diversity of ecosystems including the highest biodiversity. Its coastal areas have some activities such as rapid urbanization, intensive industrial development and agriculture, high tourism activities and fisheries production.

As the seas surroundings of Turkey have different characteristics, their biological resources have many variations. The Mediterranean Region which has the highest rate of salty and temperature among the coastal areas, is the richest region of the country in terms of biological diversity.

The Mediterranean Seal living in Mediterranean and Aegean region is one of the threatened fauna of twelve species (12) in the world. Because of habitat degradation, intensive tourism activities, pollution and hunting activities, their generation is under threatened. The Mediterranean region has also three type of tortoise and the two of them is under threatened .

As the result of the inventories carried out through collaboration between the flora specialists in Mediterranean countries, many sea plants have been identified as under threatened in the Mediterranean region of Turkey. The sea meadows which is endemic of the region, is one of the indicator species of the Mediterranean region. But, hunting, pollution, climate change, and invasion species has negatively affected the sea meadows habitat.

Turkey has 11 of the sea mammals including the Mediterranean Seal in Mediterranean region. Hunting on the mammals has been prohibited since 1983. The fish diversity of the region is quite more than the other seas.

The Database for the fauna of Turkish seas which prepared within framework of the project named "Turkish Fauna Database" and supported by the State Planning Department and the Turkish Scientific and Technical Research Institute, indicates totally 3.112 fauna species have been determined in Turkish seas. Since no any similar study about sea plants has been completed yet, there is no information about the certain numbers of these species living in Turkish seas.

The Black Sea region has a great variety of fish in terms of biodiversity and economically. There are also the four sea mammals species. Various mushrooms, algs, high level water plants and invertebrates have been found in this region.

The Sea of Marmara has play an important role like a biological corridor to provide the biodiversity through transferring of the water between Aegean and Black Sea region. Over hunting and pollution have caused a negative impact on fish species.

THREATS FOR THE COASTAL AREAS

The biodiversity losses in the marine ecosystems in Turkey depends on seven basic reasons;

1 Introduction of invasion species
2 Overhunting in fishing
3 Illegal hunting
4 Pollution
5 Habitat degradation
6 Tourism
7 Interventions on water management regime

The shore sand dunes are very sensitive and suitbale for degradation, or degraded ecosystem due to threats and pressures occurred as a result of human activities. Because of shore erosion which occurred due to road constructions, reforestation, sand collecting, summer house constructions and tourism investments, approximately 30% of the total shore dunes has been degraded in the Mediterranean and the Aegean regions.

As some factors came into existence during last 30 years regarding with climatic and human effects, the Black Sea ecosystem has been transformed to a poor health ecosystems in recent years. The important factors which affects these ecosystem are;

- Terrestrial based pollution which has been caused by the countries which have located in Danube River and Black Sea.

- Water budget negative changes has been occurred by over decreasing in the fresh water inputs through the interventions made in the water regime.

- The invasions species carrying by the shipment from other seas to Black Sea have became a dominant species and have changed the biological structure.

- In connection with the technological development overhunting practices have been increase in fishing and therefore a decreasing has been seen in the fish stocks.

Tourism and industrialization are the most important threats in on shore and marine ecosystems in Aegean and Mediterranean region.

Many forests and woodlands are being used for agriculture and farming by the villagers. This is a quite important problem for habitat degradation. After a large numbers of the people has moved to the coastal areas since 1980s , these problems has gradually increased.

LEGAL AND REGULATORY FRAMEWORK

Turkey has a number of laws and policies that address coastal zone and coastal activities. A comprehensive framework law for integrated coastal management is not available in Turkey. The main laws for the coastal zone management as follows:

1 Environmental Law (1983)

2 National Parks Law (1983)

3 The Coastal (Shore Law) (1990)

4 Council of Ministers' Decree for the Establishment of an Agency for Specially Protected Area (1989)

5 The Bosphorous Law (1983)

6 The Law for the Protection of Cultural and Natural Values (1983)

ACHIEVEMENTS

Integrated coastal zone management (ICZM) in Turkey is an important issue due to the ever-growing developmental pressures on coastal areas. Turkey is actively involved in ICZM and has capacity building on ICZM.

Progress has been made in a number of subjects. Within the framework of Barcelona Convention and Bucharest Convention, Turkey has been participating several international studies and project.

The National Committee on Turkish Coastal Zone Management (KAY) (advisory body) established in 1993 to promote integrated coastal zone management (ICZM).

Local Agenda 21 has participating the ICZM studies in Turkey. Marine Turtles National Commission was established by Ministry of Environment of Forestry (MOEF).

In 2003 the Department of Seas and Coasts was established by the Ministry of Environment and Forestry (MoEF) to prevent the pollution in that areas.General Directorate of EIA and Planning in MoEF is responsible to produce land use plans at 1/25.000 scale. It also is responsible for ICZM.

Several national and international ICZM project has been executed as follows:

- A Coastal Area Management Program project was carried out in the Bay of Izmir with the support of the Mediterranean Action Plan.

- Çıralı-Belek ICZM Project within the LIFE Program.

- Gökova Inner Bay and Sedir Island ICZM Project within the SMAP III.

Several project proposals have been submitted to the World Bank and have been found appropriate for implementation and in line with ICZM methodologies.

SHORTCOMINGS

A legal framework for ICZM and institutional mechanisms have not yet been established yet. The local governmental organizations are quite weak especially with regard to capacity building and budgeting on ICZM.

The concept and use of “management plans” for guiding coastal management in Turkey is still relatively low and has not reached widespread and efficient use. The coastal management and planning is a relatively new concept and it has been developed in recent years.

Although Turkey as a EU Candidate Country, it had not been required to submit a officially report to the EU ICZM Recommendation, It has “Turkey ICAM Report” produced by PAP/RAC within Mediterranean Action Plan.

STATUS OF THE COASTAL PROTECTED AREAS

Turkey is one of the most biologically diverse countries in the temparate world. One third of the 9.000 plant species found in the country are exclusive to Turkey and the Turkish flora includes many wild relatives of important domestic species. Turkey also has a rich and diverse fauna ,and is on one of the three major migration routes formillions of migratory birds moving between the Western Palearctic and Africa.

The biodivesity of Turkey is, however, increasingly threatened by many human induced factors, such as unsustainable land use changes, pollution and increasing population pressure on natural resources. In order to reduce or eliminate these threats, Ministry of Environment and Forestry manages the natural resources of the country in species, habitat and ecosystems bases. The objective of the Ministry is to establish intersectoral, participatory and sustainable planning and management of the species and the protected areas (Fig. 1) and to build capacity at the national level for public awareness about nature conservation and biodiversity.

Some of the protected areas are located in the coastal line of the Country. The five of them are designated as national park and the nine of them are specially protected area. The coastal national parks and the specially protected areas have a great variety of biodiversity and also an amazing landscape characteristics. These areas are under human induce pressures especially tourism activities, settlements and pollution.

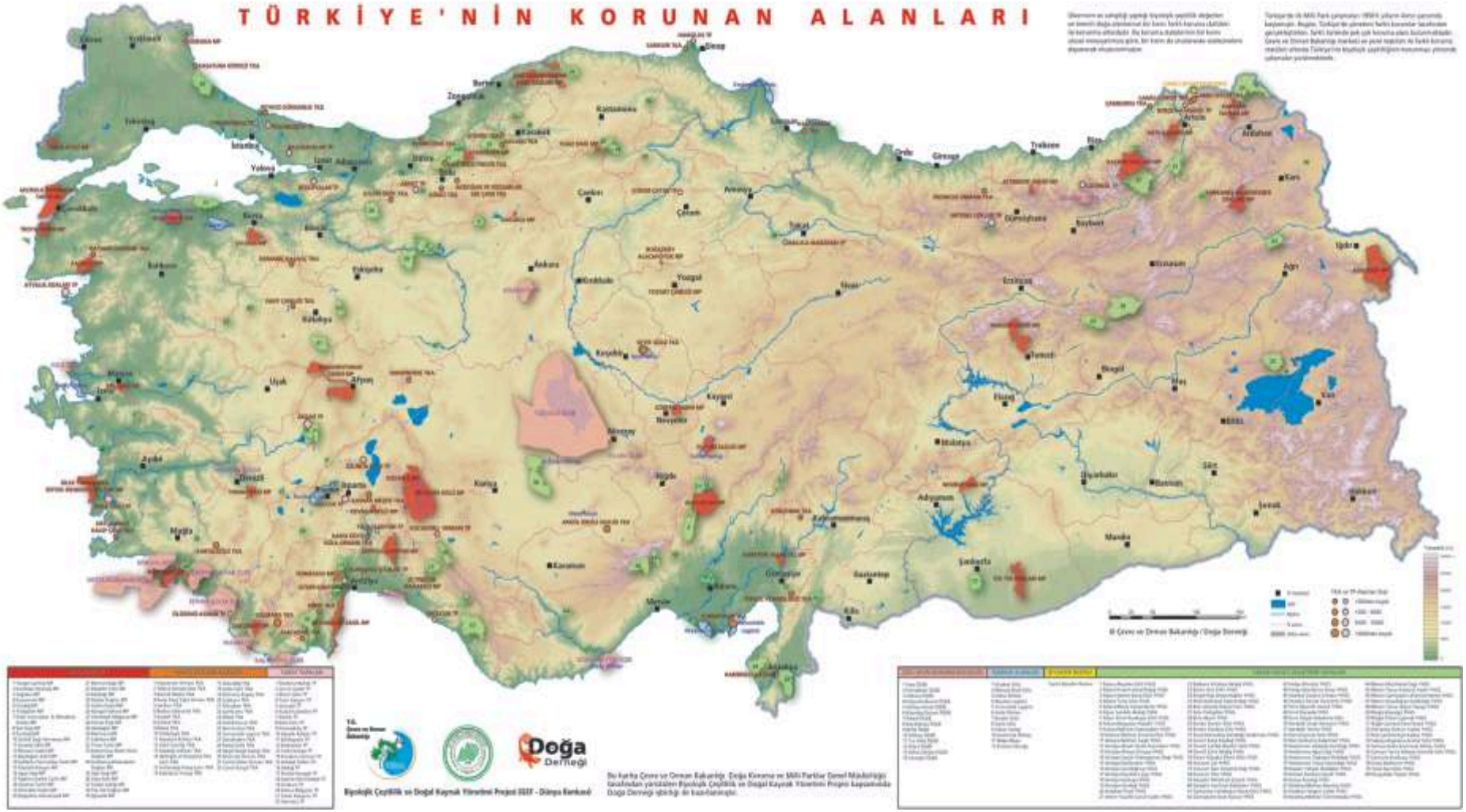

Fig. 1. Protected areas in Turkey

The major pressure and threats occurring in Turkish coastal protected areas are tourism, land conversion, cross-boundary issues and pollution. The below table (2) shows a rapid assessment and prioritization study for the coastal protected areas .In this study, the levels of pressures and threats have been identified.

The major strength in terms of management is the legal status of the protected areas and the dedication of many individuals on all different levels working on protected areas and on nature conservation in general. There is a growing interest of other groups like NGOs, universities and experts, individuals on protected area management effectiveness. A systematic protected area management and planning, which is based on clear and measurable objectives, on participatory and transparent mechanisms, allowing a regulatory evaluation regarding their effectiveness in achieving the objectives has been being developed.

The major weaknesses on protected area management and planning is insufficient stakeholder participation in the planning process which creates conflict with local interest groups. The current organizational structure of the Ministry, with protected area administration based with provincial territories rather than individual protected areas, creates a bottleneck in realising effective protected area management. The lack of coordination between various governmental organizations in relation to the same sites causes conflict of interests.

Table 2. Threat Analysis in the Coastal Protected Areas

PROTECTED AREAS	Olympus-Beydağları NP*	Dilek Peninsula NP	Gelibolu Historical NP	Marmaris NP	İğneada Longos Forest NP
THREATS					
Logging	M	L	-	M	M
Land Conversion	M	L	M	L	M
Mining	L	-	L	-	L
Grazing	L	L	-	L	H
Dams	-	-	-	-	H
Hunting	L	L	L	L	H
Non Forest Products	-	L	-	H	M
Tourism	H	M	H	M	M
Pollution	-	L	M	M	M
Semi-Natural	M	M	H	H	M
Cross-Boundary	-	H	H	M	M
Aliens	-	L	-	-	-
Afforestation	-	-	-	-	-
Excavation	-	-	-	-	L

The Level of Threats
H= High Level
M= Moderate Level
L=Low
*NP=National Parks

The follow table (3) indicates the legal status of the protected areas in Turkey. All the Laws indicated below are put into force by Ministry of Environment and Forestry except the Law on Protection of Cultural and Natural Values.

Table 3. The Legal Status of the Protected Areas in Turkey

Designation	Number of Site	Related Law
National Park	39	Law on National Parks
Nature Conservation Area	33	Law on National Parks
Natural Monument	104	Law on National Parks
Nature Park	22	Law on National Parks
Wildlife Reserve Area	88	Law on Terrestrial Hunting
Conservation Forest	56	Law on Forest
Genetic Conservation Area	188	Law on Forest
See Stand	337	Law on Forest
Specially Protected Area	14	Council of Ministers' Decree
Natural and Cultural Site	947	Law on Protection of Cultural and Natural Values
Ramsar Site	12	Ramsar Convention by Law on Conservation of Wetlands

The National parks are managed by General Directorate of Nature Conservation and National Park under Ministry of Environment and Forestry. The National Parks Law was enacted in 1983 by the Ministry in order to establish the principles governing the selection and designation of protected areas like national parks, nature conservation area, nature parks and natural monuments.

The Specially protected areas are managed by the Authority for the Protection of Special Areas under Ministry of Environment and Forestry. The Authority for Specially Protected Areas, is responsible for planning, management and monitoring specially Protected Areas (SPAs) established under the Statutory Decree No.383 on the Establishment of the Authority for the Protection of Special Areas.

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INTEGRATED COASTAL ZONE MANAGEMENT (ICZM) IN MALTA

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ABSTRACT

MAP CAMP Malta was the first exercise carried out for the Maltese Islands in integrated coastal area management. This was achieved through the implementation of a series of five thematic activities, which addressed specific sectors regarding different problems and issues pertaining to the Maltese coastline. These thematic activities were complemented by three horizontal activities. This structure was consistent with the Mediterranean Action Plan's Coastal Area Management Programme (MAP CAMP), which has been applied in several other locations around the Mediterranean basin. The MAP CAMP Malta Project was innovative since it had a lengthy preparatory phase and a short implementation phase. This proved to be very successful, as well as pragmatic, since it fell in line with the funding cycles of donor agencies. One of the most crucial outputs of the Project was the identification and organisation of a series of key issues, which were elicited from the concerns of stakeholders. Stakeholder and public participation conditioned the orientation of the Project towards a bottom-up approach where problems and issues perceived by stakeholders and the public in general were accorded the highest priority. These key issues were organised under the currently defined three principles of sustainable development: environmental integrity, economic feasibility, and social equity. This facilitated integration and the identification of gaps.

Following the identification and analysis of the sets of key issues and their interactions, MAP CAMP Malta delivered a set of strategies and specific actions organised within a comprehensive action plan. In line with its pragmatic nature, MAP CAMP Malta also provided a set of specific and prioritised post project activities as well as a feasible funding strategy divided into recommendations for the short and long term. The Project methodology developed in a demonstration area was based on the principles of ICAM and can be applied to the rest of Malta (Gozo and Comino), as well as regionally for other coastal areas where a high degree of resolution would be more appropriate.

INTRODUCTION

The Mediterranean Action Plan (MAP), as one of the regional plans of the Regional Seas Programme of UNEP, focuses its activities towards integrated management or natural resources and coastal areas, environment protection and conservation, sustainable development and assessment, prevention and control of marine pollution. The Coastal Area Management Programme (CAMP) launched in Athens in 1989 is the MAP Programme based on the principles of sustainable development and implementing sustainable coastal management, integrating environmental concerns into development planning.

The Government of Malta, in conjunction with PAP/RAC (Priority Actions Programme Regional Activity Centre), launched the CAMP Project, which was an innovative environment/management programme for Malta. The Project was the first exercise in integrated coastal area management for the Maltese Islands.

OBJECTIVES

The principal aim of the MAP CAMP Malta Project was to increase the national efforts towards sustainable management and environmental protection through the application of methodologies and tools of integrated coastal area management (ICAM). Specific issues concerning coastal area management were addressed in a holistic manner rather than by traditional land use zoning and development control.

STRUCTURE OF MAP CAMP MALTA

MAP CAMP Malta brought together various administrative, regulatory, academic and professional entities, NGOs and stakeholders (including the public) to work together towards a common goal.

The general overall management of MAP CAMP Malta (Fig. 1) at the Project level was under the direction of a National Steering Committee while the co-ordination at activity level was achieved through regular meeting of the National team leaders and with the National Project Coordinator and/or Administrator.

The thematic activities concentrated on four priority areas:
- Integrated water resource management
- Marine conversations areas
- Soil erosion/desertification control management
- Environmental health effects on tourism.

The fifth activity, Sustainable coastal management addressed gaps and emerging issues and served as a horizontal activity.

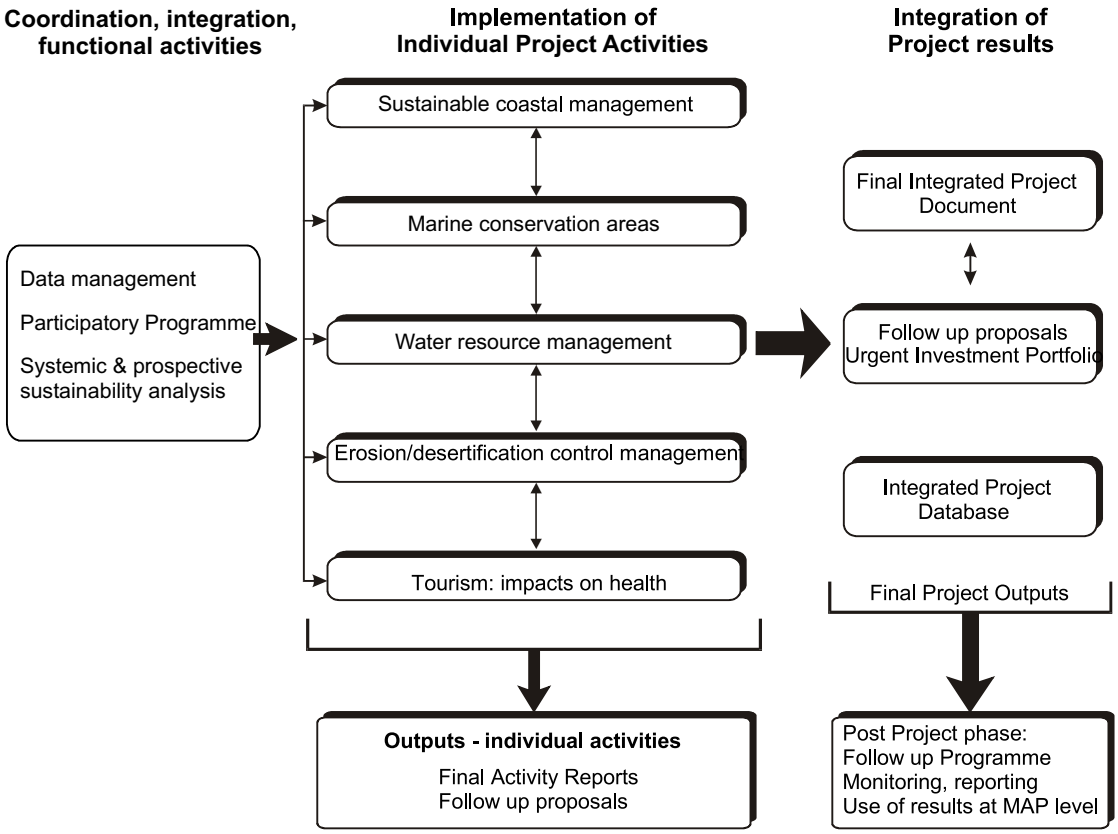

Fig. 1. MAP CAMP Malta Project Structure (Source: PAP/RAC & EPD, 1999)

PROJECT AREA

The Northwestern part of Malta (NW) has a unique geographical character since it is primarily rural in nature, with specific geological and geomorphic features (Fig. 2). The perched aquifer, the major source of potable water is also located in the Northwest.

Perhaps due to its unique natural characteristics, the Northwest is experiencing a disproportionate degree of tourist-related development. Such development places a great deal of infrastructural pressures which range from simple tourist recreational activity to more complex infrastructural demands like road construction, tourist accommodation, and energy supplies.

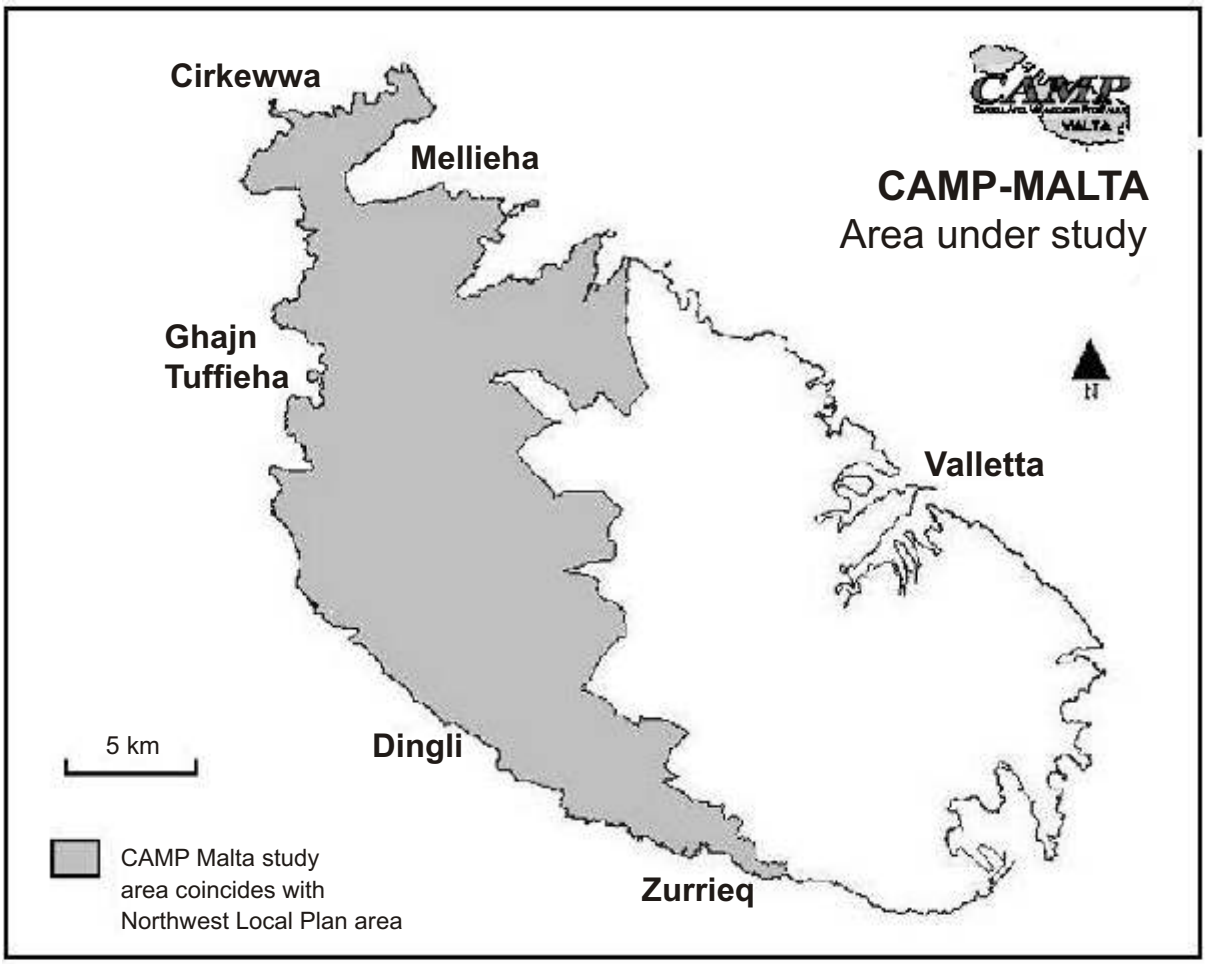

Fig. 2. Northwest Malta, showing the strip of coastal zone that was identified by MAP CAMP Malta.

OUTPUTS

On the Project level, the Final Integrated Project Document (FIPD) integrated the main results and recommendations of MAP CAMP Malta which are in fact the outputs of the five thematic activities.

The FIPD identified a series of key issues which were elicited from the concerns of stakeholders.

Key Issues

One of the most challenging objectives of MAP CAMP Malta was the logical integration of the products of the five thematic activities. At all costs, we refrained from conducting a simple cut-and-paste exercise where thematic outputs are usually presented in an *ad hoc* fashion albeit comprehensively reproduced. This would have produced a repetition or summary of the individual thematic reports. Under such circumstances, the integrative process would have been left to the final users of the document.

We felt that our task was to elicit the main issues that could be identified from the thematic reports and to attempt to integrate these issues within a definable structure. We believe that we successfully addressed this problem with the identification and organisation of a series of aptly named ***Key Issues***. These proved to be one of the most crucial outputs of the project.

Within environmental management and planning, an issue can be defined as a point in question and thus serve as an important subject of debate or litigation. Key issues therefore, can be defined as issues which have highly strategic outcomes. Such outcomes normally have spatial as well as functional dimensions. In this respect, key issues are fundamental considerations in integrated coastal

area management. They also characterise the problem-driven approach to environmental planning and management.

Several different criteria can be employed to define key issues. Zonation exercises, conducted by land use planners, often focus on the magnitude of the geographical expression of a particular issue. This is normally combined with the severity of its socio-environmental impact. This gives raise to key issues that reflect social values or more often, some elements of social inequity. Another criterion that can be used for the definition of a key issue is the fact that it can be adequately addressed through a specific set of recommendations.

Within MAP CAMP Malta, key issues were largely elicited from the concerns of stakeholders. This conditioned the orientation of the project towards a bottom up approach where problems and issues identified by stakeholders and the public in general were given the highest priority. In this respect, the role of the authors of most thematic activities was seen as more of facilitation rather than prescription.

These issues also fit into the general strategy of ICAM which is a continuous process and should not end with the drafting of a final exhaustive and prescriptive document - no matter how integrated it might be. It should rather be regarded as the initiation of a process which is aimed at achieving sustainability within the coastal zone. Thus, one of the major contributions of MAP CAMP Malta was the delivery of the method that has been employed to define and identify key issues.

Organisation of the Matrices

The key issues were presented as a set of matrices (Tables 1a - d) which aim to facilitate reading and ease of comprehension. Each of these issues was derived from the thematic groups which formed the basis of MAP CAMP Malta Project. Each thematic group has a separate set of key issues. This grouping exercise also served to identify gaps within each thematic group and ensured some measure of comprehensiveness.

Horizontal headings in the matrices reflect a standard logical argument where particular key issues are discussed in terms of the manifested problem, the main identifiable causes of the problem, the geographical sphere of impact of the issue and any specific actions which are currently addressing some aspect of the issue or some future actions that can address it.

Gaps and emerging issues

MAP CAMP Malta was also concerned with the identification of management gaps. These were classified as functional (gaps identified in the legal, administrative and management structures and spatial (gaps in management structures which affect specific areas or locations) gaps. Emerging issues (either technological issues which, until recently, appeared to be without possible application to Malta, or to geopolitical issues which are emerging due to regional or bilateral issues) were also identified.

STRATEGIC ACTION PLAN AND POST PROJECT ACTIVITIES

Following the identification and analysis of sets of key issues and their interactions, MAP CAMP Malta delivered a set of strategies and specific actions which were meant to address, correct or mitigate these identified problems.

This action plan has been organised into another set of matrices (Table 2 is just one example of these) outlining proposed strategy elements aimed at bringing about the required changes. In this respect, the categories refer to governance, legal action, capacity building, knowledge and information, economic instruments, technological innovations and protection of coastal resources.

These matrices were meant to facilitate action since they provided clear objectives, specific actions, clear identification of the responsible authority, as well as the stakeholders that should be involved. Information regarding the time frame and the geographical extent of the proposed action as well as some indication of the relative cost of the project, possible sources of funding and the feasibility of the action's realisation was also given. In short, there is enough information so that specific actions may be taken up by the concerned entities, for incorporation into their business plans.

Table 1a. Securing Environmental Integrity for sustainable tourism into the foreseeable future (Source: Vella *et al*., 2003).

KEY ISSUES	PROBLEM	CAUSES	ZONE OF INFLUENCE	ACTIONS TO IMPLEMENT
Ensure a clean healthy environment	Air pollution threatens natural resources and the quality of the visitor experience.	Transportation and power generation are not complying with established thresholds.	Maltese Islands	Sources of pollution should comply with established standards. Provide co-ordinated concerted efforts by the relevant authorities to satisfy the tourism and health sectors.
Provision of good quality drinking water	Deterioration of water quality.	Contamination of aquifers. Semi-arid climate and accelerated demand, hindered aquifer recharge status.	Aquifers	Tourism sector should take the lead in water conservation. Better management of demands of water by the tourism sector. Ensure aquifer recharge. Relevant management plans should address the issue.
Preservation of the natural ecosystems	The protection and maintenance of ecologically sensitive areas is perceived as the sole duty of Malta Environment and Planning Authority.	Degradation of natural environment has immediate negative impacts on the tourism sectors, thus a decrease in the economic gains to Malta.	Ecologically sensitive areas	Tourism industry must contribute and actively participate in the conservation and rehabilitation of the natural ecosystems of Malta. Tourism development and activities must be in conformity with environmental considerations. CCA needs to be introduced and applied as a tool sustainable utilisation of resources.
Solid waste management	Contamination leading to rodents, disease outbreaks.	Lack of education amongst coastal zone users. Inadequate funding structures for beach cleaning.	Beaches	Sustained awareness campaign. Provision of amenities, provision of adequate collection and removal of solid waste, ensure enforcement.

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Table 1b. Securing Environmental Integrity for sustainable tourism into the foreseeable future (Source: Vella *et al*., 2003).

KEY ISSUES	PROBLEM	CAUSES	ZONE OF INFLUENCE	ACTIONS TO IMPLEMENT
Bathing water quality	Discharge of untreated sewage, inshore fish farms, hydrocarbons from shipping industries and land based sources, sediment and pollutants from storm water runoff.	Inadequate enforcement and control of off shore activities and illegal practices	Marine environment	Blue Flag management standards applied for specific beaches. Fish farms taken offshore, enforce stricter control on permit holders and shifting of existing farms further offshore. Ensure management of storm water and proper runoff points for storm water. Encourage tourism sector to reuse/recycle methods, create incentives to maintain good bathing water quality in the contiguous beaches of the hotel, including monitoring, cleaning, etc. Empower environmental wardens to issue hefty and on the spot fines.
Ensure high quality agricultural produce for tourism sector	The tourism sector depends to a large extent on the quality of agricultural produce. A decrease in quality and quantity of agricultural produce would lead the tourism sector to rely heavily on non-indigenous products.	Loss of agricultural productivity by e.g. soil erosion, decrease in soil quality.	Agricultural areas	Promote organic farming. Encourage sustainable agricultural practices, e.g. integrated pest management. Encourage establishment of firm link between agricultural and tourism sectors stressing their interdependence.
Integration of touristic development and Hotel landscaping within the Mediterranean rural character	Loss of local Mediterranean character.	Planting of non-indigenous species, lack of awareness of potential market niche.	Hotels and tourism development areas	New landscaping development should utilise the use of indigenous species. Create incentives to hoteliers to promote indigenous food grown within the hotel grounds themselves. Insert criteria for using xeroscape in the grading.

Table 1c. Securing Environmental Integrity for sustainable tourism into the foreseeable future (Source: Vella *et al*., 2003).

KEY ISSUES	PROBLEM	CAUSES	ZONE OF INFLUENCE	ACTIONS TO IMPLEMENT
Conserve and protect the cultural and historical heritage of the Maltese Islands	Maltese heritage potential is currently under-utilised, and there is much scope for its development to meet the needs of specific sectors such as tourism. There is a lack of information amongst the locals and internationals on the cultural wealth of such sites.	The management needs are not proportional to huge scale and endowment of heritage wealth in the Maltese Islands.	Cultural sites	Current re-organisation of the Museums Department into an agency which is more responsive to the need of the Maltese heritage. Establishment of a National Heritage Inventory to provided baselines for future management plans.
Promote agro-tourism aimed at specific agricultural produce, e.g. viticulture, olive production	Under-utilisation of agricultural resources and potential within the tourism sector.	Lack of appreciation of economic value of agricultural resources as a source of tourist investment.	Maltese Islands	Sensitisation of Department of Agriculture. Encourage viticulture and olive production, gastronomic products, e.g. sun dried tomatoes.
Promote cultural and historical sites	Lack of appreciation by locals and foreigners.	Lack of promotion and lack of related activities.	Maltese Islands	Re-direct finances back for the management of these sites. Create more heritage trails. MTA should take a leading role in sponsoring the promotion. Promote more festivals geared at specific indigenous activities, e.g. wine picking.

Table 1d. Securing Environmental Integrity for sustainable tourism into the foreseeable future (Source: Vella *et al*., 2003).

KEY ISSUES	PROBLEM	CAUSES	ZONE OF INFLUENCE	ACTIONS TO IMPLEMENT
Provision of up-dated information to tourists	Tourists are not always aware of the ecological, scientific and cultural value of the Maltese Islands, including to the coastal zone.	Tourist information brochures do not adequately address the issue and emphasis is given to the recreational aspect only.	Maltese Islands	MTA, NGOs and other concerned authorities should strengthen efforts to promote more environmentally sensitive tourism. Promote Eco-tourism. MTA should use all available means to promote, prepare and disseminate information.
Develop eco-label and certification schemes	Lack of sufficient knowledge on environmental and/or health issues within people employed in the tourism industry as well as the tourist themselves.	Lack of adequate training and environment education within the tourist industry.	Tourism sector	Promote rewards for best practice, enhance marketing of awards. Promote environmentally friendly management. Ensure adequate training. Promote environmental audits and other related environment conscious initiatives.
General public should be made aware that their well-being and that of the tourist is directly related to the state of the environment	A deterioration of the quality of the environment leads to decrease in the well-being of the domestic and foreign tourist; also a decrease in tourists visiting the Islands.	Environmental health issues are not given due importance.	Maltese Islands	The Tourism strategy should integrate environment with health aspects. Initiation of an evaluation of the impact of tourism on the environment and the health of the national population.

CONCLUSION

One of the great strengths of the CAMP process was its focus on articulating the perceived needs of stakeholders. This involved a great deal of personal communication and the reinforcing of established institutional or group-centred links. These were strengthened through the various and successive MAP CAMP-centred workshops and related activities such as public participation conferences. The net result was that most of the key issues, recommendations, and action plans originated from the relevant stakeholders and members of the general public.

Rather than working in parallel, many individual contributors to MAP CAMP Malta found that their contributions converged into one specific unified output. This served as a positive experience which should encourage future cooperation between governmental departments. On the other hand, it is worth noting that different forms of inter-departmental rivalry came into play at higher administrative levels and these created some problems with the implementation of some post-project activities.

The achievement of Malta's first Marine Protected Area is a direct result of CAMP Malta and its greatest strength is the linking of marine environmental protection with terrestrial protected sites.

It is imperative that grass-root organisations need to continue participating in the evolving coastal planning process in order to secure ownership over their own recommendations and to ensure the realisation of their needs.

Table *2*. Example of a proposed post-project activity: Improving the status of beaches in the Northwest (Source: Vella *et al*., 2003).

Title	**IMPROVING THE STATUS OF BEACHES IN NORTHWEST**
Geographical extent	Northwest, Malta
Lead agency	Subregional Centre on Tourism, Environment and Health
Aims	To draw up recommendations to upgrade the state of beaches in the NW to Blue Flag standards as minimum.
Objectives	Identification of potential Blue Flag beaches in the NW Draw up recommendations for the upgrading of these beaches to Blue flag criteria Draw up recommendations for beach management of non Blue Flag beaches Draw up policy of action for setting up beach management committees Serve as a demonstration model for management of beaches in Malta and in the Mediterranean, especially in islands.
Benefits	Effective beach management and maintenance Increased regular and continuous monitoring of the status of beaches Increased quality of beach experience
Project duration	18months
Implementation costs	US$ 35, 000

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EUROPEAN FISHERIES FUND

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The year 2007 draws a dividing line between the past and the priorities of the new *Common Fisheries Policy (CFP).*

The achievement of the objectives of conservation and sustainable development, as defined in the conclusions of the European Councils of Lisbon and Göteborg, are the major themes on which the CFP (Common Fisheries Policy) is based. Council Regulation (EC) No 1198/2006 (O.J. L 223/1 of 15 August 2006) guides the actions, states the procedures and establishes the *European Fisheries Fund* (EFF). Each Member State develops an OPERATIONAL PROGRAMME (NOP) for the adoption of policies and priorities to be *co-financed* through the EFF, consistently with the NATIONAL STRATEGIC PLAN that fixes the priorities, the objectives, the public financial resources and the terms of implementation.

The general objective of the EFF 2007-2013 is to guarantee economic, environmental and social sustainability of the fisheries and aquaculture sector, to reduce pressure on stocks and protect the marine environment, in a Community of *27 Member States,* with a financial allocation of 4,339 million Euros.

The main objective of the EFF is to facilitate the implementation of the CFP, by promoting sustainable balance between resources and the fishing capacity of the fleet, helping the fishers' communities to diversify their economy and compensate the individuals for their departure from the sector, increasing subsidiarity through concurrent efficient and shared management.

The Italy NOP (National Operational Programme) was approved by the European Commission and led to the granting of the financial resources set out in the EFF and the programming of the actions falling within the Regions' competence. The NOP contains five Axes that include Measures.

The EEF financial allocation to Italy is about 10% of overall allocation. Italy will totally receive 424,342,854 €, broken down following the principle of resources concentration, between the convergence objective and the non-convergence objective :

- Convergence Objective: 318,281,864 € (**Puglia**, Calabria, Campania, Sicily and Basilicata)
- Objective of non-convergence:106,060,990 € (Sardinia + other regions)

PRIORITY AXIS I - ADJUSTMENT OF THE FLEET

1 Adaptation of the Community fishing fleet: permanent cessation, temporary cessation, investments on board (including replacement of engines and fishing gears), support to small-scale coastal fishing, socio-economic measures, public aid for rescue and restructuring plans.
2 Aquaculture, inland fishing, processing and marketing: productive investments, aqua-environmental measures, public health measures, inland fishing, processing and marketing.
3 Measures of common interest: collective actions, protection and development of aquatic fauna and flora, fishing ports, landing sites and shelters, development of new markets and promotional campaigns, pilot projects, modification for reassignement of fishing vessels.
4 Sustainable development of fisheries areas.
5 Technical assistance.

Permanent cessation

Under the fishing effort adjustment plans through scrapping of the fishing vessel, reassignment for activities outside fishing, creation of artificial reefs.

The fishing effort adjustment plans are the major tool for the reduction of fishing effort.

Such plans can be applied if they are part of:

- plans for the recovery of species, emergency measures, the non-renewal of a fisheries agreement between the Community and a third country or a substantial cut in fishing opportunities under an international arrangement,
- management plans,
- national measures for conservation and management of fisheries resources,
- national plans for exit from the fleet.

They shall include the following elements:

- description of the context: concerned fishery activity (fleets, zones and fish stocks). Where necessary, biological status of resources and present levels of the fishing capacity and effort,
- expected results in terms of fishing effort levels and, where applicable, contribution set out for improving fish stocks or profitability of the concerned fleet.

Temporary cessation

1 ***National fishing effort adjustments plans.***
2 Emergency measures, adopted by the member State, in the context of the fishing effort adjustment plan.
3 Emergency measures, in the context of the fishing effort adjustment plans.
4 The non-renewal of a fisheries agreement/ substantial cut in fishing opportunities.
5 ***National/regional management plans or local management plans***.
6 Rescue and restructuring plans, for replacement of engines.
7 Natural disasters, closures of fisheries for reasons of public health, exceptional occurrence which is not the result of resource conservation measures.

The EFF may contribute to the financing of measures of aid to temporary cessation of fishing activities in favour of fishers and vessel owners. The suspension of the fishing activity is exerted through the suspension of the fishing licence.

Investments on board fishing vessels and selectivity

- Improvements of safety on board. Working conditions, hygiene, product quality.
- Conservation of catches the discarding of which is no longer authorized.
- Modernization as part of a pilot project.
- Fishing methods to reduce environmental impact.
- Replacement of engines aimed at better energy efficiency without increasing the catch capacity.
- Replacement of fishing gear.
- First replacement of selective gear pursuant to Community constraints.

The EFF may contribute to the financing of equipment and modernisation of fishing vessels of five years of age or more, only provided that:

- This does not increase the ability of the vessel to catch fish.
- They are not new constructions.
- Fishing vessel: any vessel within the meaning of Regulation (EC) no. 2371/2002 (the expression 'living aquatic resources' means available and accessible living marine aquatic species, including anadromous and catadromous species during their marine life; the expression "commercial exploitation", used in the definition of fishing vessel, means the commercial exploitation of available and accessible living aquatic marine species and, therefore, doesn't refer to aquaculture).

The EFF may contribute to one replacement of the engine per vessel:

- For vessels of less than 12 metres, provided the new engine has the same power as the old one or less.
- For vessels up to 24 metres in overall length, the new engine has at least 20% less power than the old one.
- For trawlers of more than 24 metres in overall length, the new engine has at least 20% less power than the old one, the vessel is subject to a rescue and restructuring plan, in observance of the Community guidance on aid for rescue and restructuring of firms in difficulty, and changes to a less fuel-intensive fishing method.

Small-scale coastal fishing

This measure grants aid for investments on board and socio-economic aid. Premiums to fishers and owners to:

- improve management of and access to resources,
- organize production, processing and marketing,
- encourage voluntary steps to reduce fishing effort,
- use of technological innovations,
- improve professional skills and safety training.

“Small scale fishing” means fishing carried out by fishing vessels of an overall length of less than 12 metres and not using towed gear. Public aid intensity for investments on board of fishing vessels and selectivity, the same as the aid conditions for the replacement of the engine, are more favourable for fishing vessels that practice small-scale coastal fishing than for the remaining fleet.

Socio-economic measures

- Diversification of activities.
- Upgrading professional skills.
- Retraining in occupation outside sea fishing.
- Early departure from the fishery sector.
- Non renewable compensation to fishers provided that:
  a. The vessel is under permanent cessation;
  b. fishers are on board from at least 12 months.

Individual premiums for young fishers (younger than 40 years) for the purchase of the first vessel, provided that:

- they have worked at least five years as fishers or have equivalent professional training,
- they acquire for the first time part or total ownership of a fishing vessel of less than 24 metres in overall length which is equipped to go fishing at sea and is between 5 to 30 years old,
- the premium shall not exceed 15% of the cost of acquisition of ownership nor exceed the amount of 50,000 Euros.

PRIORITY AXIS II - AQUACULTURE, INLAND FISHING, PROCESSING AND MARKETING

Aquaculture, inland fishing, processing and marketing of aquaculture products, namely:

1 Productive investments.
2 Aqua-environmental measures.
3 Public health measures.
4 Animal health measures.
5 Professional training.

"Aquaculture“ means the rearing or cultivation of aquatic organisms using techniques designed to increase the production of the organisms in question beyond the natural capacity of the environment; the organisms remain the property of a natural or legal person throughout the rearing or culture stage, up to and including harvesting.

The acquisition or construction of ponds or other aquaculture facilities to be exclusively used for training purposes, for lifelong learning, may be financed for an amount not greater than 10% of total eligible expenditure.

As horizontal issue, priority is given to professional training

Productive Investments

Investments in the construction, extension, equipment and modernisation of production installations for one or more of the following objectives:

- Diversification towards new species with good market prospects.
- Environmentally-friendly aquaculture methods.
- Support for traditional aquaculture activities.
- Purchase of equipment aiming at protecting the farms from wild predators.
- Improvement of working and safety conditions.

“New species” are those whose production is poor or non-existent and with good market prospects.

“Specie with good market prospects” are species for which, according to a medium-term trend, the demand will probably be greater than supply.

“Environmentally-friendly production methods” means the following aquaculture techniques :
- *off-shore raising*, namely marine aquaculture in unprotected marine areas,
- *raising with water recirculation*.

“Traditional aquaculture” means an activity with practices consolidated over time, correlated to the social context and the cultural heritage of a given area.

“Traditional aquaculture activities” are considered to be:
- oyster farming on the Atlantic French coast and mollusc farming in many European coastal areas,
- extensive or semi-intensive lagoon farming of bass and giltheads, in some northern Italy regions and southern Spain,
- intensive bass and gilthead raising in net cages is not considered to be a a traditional aquaculture activity,
- extensive carp raising in ponds in some areas of central Europe.

“Current practices used in aquaculture” means the activities performed in compliance with mandatory standards in human and animal health or environmental matters.
Aid can refer to service boats used in aquaculture.

Aqua-environmental measures:

- Raising activities having a beneficial impact on the environment.
- Participation in EMAS schemes (Reg. EC 761/2001).
- Organic aquaculture (Reg. EEC 2092/91).
- Sustainable aquaculture compatible with the constraints of Natura 2000 areas.

The aid for aqua-environmental measures can only be granted for the use of aquaculture production methods and not for improvement of the environment outside those farms.

The EFF may support granting compensation for the use of aquaculture ***production methods helping to protect and improve the environment and to conserve nature:*** the aid solely concerns the costs of participation in the Community eco-management and audit scheme (EMAS) prior to the approval of the system for each single farm. Aid can be granted only to aquaculture farms subject to specific restrictions or prescriptions to be included within or in proximity of Natura 2000 areas and only when specific environmental restrictions or prescriptions are imposed on the farms by the national regulations or by contracts of management plans of legally mandatory sites. Such provisions are justified by the need of compensating farmers who are obliged to make additional investments (or who incurred losses of revenue) resulting from the designation of Natura 2000 area, in accordance with Council Directive 92/43/EEC of 21 May 1992, on the ***conservation of natural habitats and of wild fauna and flora***.

"Organic aquaculture” means aquaculture activity aiming at producing aquatic species following the organic method.

“Sustainable aquaculture” means the activity compatible with the specific environmental constraints resulting from the designation of Natura 2000 areas in accordance with Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

“***Good practice in aquaculture”*** means to comply with the mandatory standard in human and animal health or environmental matter, and use production specifications that prevent waste of resources and avoid pollution.

"Aqua-environmental requirements which go beyond the mere application of normal good aquaculture practice" means the use of aquaculture methods that not only apply the good practices in agriculture, but also exert **a beneficial impact on the environment**. Such aquaculture methods, for

instance, ***reduce pollution outside aquaculture installations, are home and food to protected bird species and/or contribute to maintain landscape and traditional elements of rural areas.***

Aquaculture activities that contribute to preserve and improve the environment refer, in particular, to some extensive or semi-extensive production methods like: multiple raising (raising different species) practiced in coastal lagoons of the Mediterranean and Portugal coasts.

These aquaculture practices might be integral part of the ***brackish water coastal eco-system***, removing nutrients and **avoiding natural eutrophication and the destruction of lagoons**. Moreover, works are performed (canal excavation, and so forth) to maintain good water circulation in the lagoon and avoid sludge accumulation. ***Such systems are compatible with the maintenance of wetlands in a beneficial state, also as stop-over habitats and nesting sites for aquatic birds. The same applies to the systems of inland ponds in central Europe, which can also act as protection areas because of the high amounts of nutrients resulting from agricultural land leaching and the stream systems that receive them. Extensive carp raising can thus play an important ecological role in areas where agricultural production is prevailing.***

Public human and animal health measures:

- Compensation to mollusc farmers for the temporary suspension of harvesting owing to the proliferation of toxin-producing plankton.
- Control and eradication of diseases.

Inland fishing

Inland fishing means fishing carried out for commercial purposes by vessels operating exclusively in regional inland waters.

Support for inland fishing may cover:
- Investments for the construction, extension, equipment and modernization of inland fishing facilities, with a view to improving safety, working conditions, hygiene and product quality, human or animal health, or to reducing negative or having beneficial impact on the environment.

Fishing vessels operating exclusively in “inland fishing” are those equipped for the commercial exploitation of living resources in inland waters and not included in the Community record of the fishing fleet.

Measures for temporary cessation are financed provided that the measures for restocking the species in inland waters are foreseen by a Community legal act.

Processing and marketing

- Investments in processing businesses to improve working conditions, hygiene, public health, product quality and niche markets, reduce negative impact on the environmental, improve the use of little-used species, by-products and waste.
- Producing and/or marketing new products, applying new technologies and/or developing innovative production methods.
- Marketing products mainly originating from local landings and aquaculture.
- Life-long learning.

Processing and marketing fishery and aquaculture products may include operations that change the anatomical integrity of fishes, like:
- Eviscerating, cutting into slice, filleting, peeling, hedging, shelling, etc.
- Washing, cleaning, calibrating, purifying bivalve molluscs.
- Preserving, freezing and packaging, including vacuum-packing or under modified atmosphere.
- Processing, namely, heating, curing, salting, dehydrating or pickling, etc., fresh, refrigerated or frozen products, also associated with other elements, or a combination of various processes.
- Marketing, namely, keeping or exposing for sale, sale, delivery or any other way for marketing within the European Community.

Member States recognize priority to micro and small-sized enterprises.

Investments concerning products not to be used for human consumption may be granted only provided that they are investments exclusively concerning treatment, processing and marketing of fishery and aquaculture product waste.

PRIORITY AXIS III - MEASURES OF COMMON INTEREST

1 Collective actions.
2 Protection and development of aquatic fauna and flora.
3 Fishing ports, landing sites and shelters.
4 Development of new markets and promotional campaigns addressed to consumers.
5 Pilot projects.
6 Changes to boats for purposes of public utility, research and training.

Collective actions are actions that go beyond investments usually made by the private sector to meet the objectives of the CFP, namely, measures of common interest with a broader scope than measures normally undertaken by private enterprises, which are implemented with the active support of operators or by organizations recognised by the Member State.

“Organizations recognized etc.", means public or private organizations, like NGO, scientific or commercial organizations, and so forth. They may be designated by the Member State for the implementation of supported actions, if those measures are, by their nature, implemented more effectively by other organizations. For instance, removal of lost fishing gear from the sea bed in order to combat ghost fishing, can be more effectively performed by an environmental organization, whereas upgrading professional skills or developing new training methods and tools can be more effectively achieved by a credited training centre.

Collective actions

Collective actions cover the following activities:
- promoting selective fishing methods or gears,
- contributing to the transparency of markets,
- removing lost fishing gears from the sea bed, improving working and safety conditions,
- improving fishing products quality,
- improving management and control of conditions of access to fishing areas, through local management plants, and so forth.

Collective actions, which are implemented with the active support of operators themselves or by organizations acting on behalf of producers or other recognized organizations, are aimed at obtaining an added value greater than the one resulting from the summation of individual investments.

The support to measures aiming at improving the management and control of access conditions to fishing areas, may include *drawing up local management plans* approved by the competent national authorities, through consultancy, meetings, studies and other initiatives to improve access conditions. Effective management and control of access conditions (for instance, temporary or permanent cessation of fishing activities, investments on board of fishing vessels and selectivity) are granted financing only within priority Axis I.

Financing may be granted for creating producers organizations to:
- Facilitate the establishment of recognized Producers' Organizations (PO).
- Implement the plans of (PO) that received specific recognition, to facilitate the implementation of plans for the product quality improvement.
- Restructure (PO) to increase efficiency, to meet market requirements.

The costs for experimental fishing are eligible.
The expression "exploratory fishing” , refers to the use of various types of equipment for searching the fish and fishing gear to asses what types of fishes are present in a given area and in what amounts, in order to have an idea about the extent of stocks and economic profitability of they commercial exploitation.

"Facilities for life-long learning" are eligible only within the limits of an amount not greater than 10% of total eligible expenditure for the concerned operation.

"Facilities for life-long learning" means material investments in large-scale facilities, like buildings, fishing vessels or fish raising.

Measures intended to protect and develop aquatic fauna and flora

Measures of common interest are intended to protect and develop aquatic fauna and flora while enhancing the aquatic environment, in particular:

- Construction or installation of static or movable facilities intended to protect and develop aquatic fauna and flora.
- Rehabilitation of inland waters, including spawning grounds and migration routes for migratory species.
- Protection and enhancement of the environment in the framework of Natura 2000.

The actions must be implemented by public or semi-public bodies, recognised trade organizations or other bodies appointed for that purpose by the Member State.

Artificial reefs have to be used only in situations where fishing mortality rate is regulated, for instance, through the suspension of fishing or by technical measures.

The purchase of a vessel to be submerged and to be used as artificial reef in not eligible.

In the case of a fishing vessel intended to be used for the creation of artificial reef, public aid for permanent cessation of the fishing activities shall be paid to the owners of the fishing vessels.

Financing refers to the expenses relative to the preservation measures required for the sites being part of the ecological European network Natura 2000. Financing may cover the elaboration of plans, strategies and management systems, facilities, including depreciation and equipment for the reserves and training addressed to the reserve personnel and relevant studies.

Direct restocking (releasing live aquatic organisms, obtained from incubators or caught elsewhere), compensation for renunciation for rights, loss of revenue or salaries to the staff shall not be eligible for aid.

Fishing ports, landing sites and shelters

- Investments relative to existing public or private fishing ports, which are of interest to fishers and aquaculture producers using them, with the aim of improving the services offered.
- Investments to reconstruct landing sites and to improve the conditions for fish landed by coastal fishers in existing fish landing sites designated by the competent national authorities.
- Investments to improve safety of fishers and for the construction or modernisation of small fisheries shelters.
- Ports equipment of inland water, landing sites and fisheries shelters.

The aid applies to landing sites and fisheries shelters, concerning the observance of relevant sanitary measures and the application of control measures, as well as port equipment of inland waters. In compliance with the general principles relative to common interest measures, existing (public and private) fishing ports can apply for the EFF aid provided the investments made meet the following criteria:

- common interest,
- wider scope of the measures adopted by private businesses,
- intended to improve the services offered.

The construction of fishery ports is not eligible for aid, whereas, to improve fishers' safety, the EFF may support investments for the construction or modernisation of small fishery shelters.

Development of new markets and promotional campaigns

Measures intended to implement a policy of quality and value enhancement, development of new markets or promotional campaigns for fisheries and aquaculture products, in particular related to:

- conducting regional, national or transnational promotional campaigns,
- the supply to the market of surplus or underexploited species,
- the implementation of a quality policy,
- promotion of products obtained using methods with low impact on the environment,
- promotion of recognised products,
- quality certification, including label creation and the certification of products obtained using methods with low impact on the environment,
- campaigns to improve the image of fisheries products,
- implementation of market surveys.

The operations may not be aimed at commercial brands or make reference to specific countries or geographical areas, except in case of products recognised under the terms of Council Regulation No. 510/06, on the protection of geographical indications and designations of origin for agricultural products and foodstuffs.

The aid shall relate to:
1 The costs for advertising agencies and other suppliers of services for the preparation and implementation of actions.
2 The purchase or rent of spaces for initiatives entrusted to mass media, the creation of slogan or brands for the duration of actions.
3 The expenses for publications and external personnel required for the actions.
4 The organization and participation in fairs and exhibition.

Pilot projects

Objectives:
- test the technical or economic viability of an innovative technology,
- enable tests to be carried out on management plans and fishing effort allocation plans,
- develop and test methods to improve gear selectivity, reduce by-catches, discards or the impact on the environment, in particular on the sea bottom,
- test alternative types of fishing management techniques.

Pilot projects, including the experimental use of more selective fishing techniques, intend to acquire and disseminate new technical knowledge implemented by an economic operator, a recognised commercial association or any other competent body designated by the Member State, in cooperation with a technical or scientific organism.

Pilot projects are not of direct commercial nature. Any profit that might originate from the implementation stage of a pilot project is deducted from the public aid granted to the operation.

The pilot projects have to exhibit limited duration and cost, following the preservation and improvement of the environment within Natura 2000.

The costs relative to experimental fishing are not eligible unless they refer to the experimental use of more selective techniques and/or fishing gears in order to determine the impact on fishery stock and /or the marine environment.

Modification for the reassignment of fishing vessels

The EFF may support the modification of fishing vessels for their reassignment under the flag of a Member State and registered in the Community for training or research purposes in the fisheries sector or for other activities outside fishing.

These operations shall be limited to public or semi-public bodies (for instance, school or research institution) and the aid covers the costs for the modification of a fishing vessel to adapt it to the new use outside fishery (for instance, training or research) after its reconversion.

The aid is granted only if the fishing vessel in question has been definitely cancelled from the Community register of the fishing fleet and the fishing licence associated with it.

If the fishing vessel in question had been previously used for activities outside fishing, the foreseen aid is paid to the original owner of the fishing vessel and not to the public body.

The fishing vessel could have been purchased by the public body or transferred to it for free.

PRIORITY AXIS IV - SUSTAINABLE DEVELOPMENT OF FISHERIES AREAS

Implementation of an integrated local development strategy based ***on a bottom-up approach leaving more scope for the local level, pursuant to the subsidiarity principle.***

Objectives:
- maintain and develop jobs in fisheries areas through support for diversification or the economic and social restructuring,
- maintain the economic prosperity and add value to fisheries products,
- promote the quality of the coastal environment,
- promote National and transnational cooperation between fisheries areas.

PRIORITY AXIS IV is a novelty with the new European Fishery Fund

The EFF may provide assistance, complementary to the other Community instruments, for the sustainable development and improvement of the quality of life in fisheries areas eligible as part of an overall strategy which seeks to support the implementation of the objectives of the common fisheries policy, in particular taking account of its socio-economic effects.

Eligible areas, as a general rule, are those smaller in size than NUTS 3 and are areas with:

- Low population density.
- Fishing in decline.
- Small fisheries communities Areas NUTS 3: the common Classification of territorial units for statistics within the meaning of Regulation (EC) No. 1059/2003 of the European Parliament and of the Council of 26 May 2003.

Promoters:

- Representatives of the local socio-economic sector, private and public for a local development integrated strategy (groups).
- Coastal Action Groups (CAG) for implementing the operations: most of operations are carried out by the private sector.

These measures are implemented by local authorities that represent the public and private partners of the various relevant socio-economic sectors and pursuant to the proportionality principle they have adequate administrative and financial capacity to manage interventions and ensure that operations are successfully accomplished.

The territory covered by a group has to be homogeneous and represent, geographically speaking, a sufficient critical mass to sustain a feasible local development strategy.

A fishery area selected for the purposes of the intervention of the Priority Axis IV does not necessarily coincide with a national administrative subdivision.

Where applicable, the group should be based on existing organizations that have acquired experience in the sector, for instance taking into account the areas established for the purposes of actions of the Structural Funds or the territories covered by local action groups of Leader (LAG). If a working group of Priority Axis IV is based on an existing local action group of Leader (LAG), the same administrative structure can be used for the implementation of both Community funds. Common running costs shall be thus subdivided (proportionally) between the EFF group (CAG) and LAG.

The local development strategy proposed and implemented by the group shall include actions complementary to the other Community or National instruments. However, since the local development strategy is proposed by the group of the body of the Member State in charge of its approval, it has to consist in a separate and autonomous document that provides information on the complimentarily of the measures to be financed with those financed by other Community or national instruments.

Eligible measures

- Strengthening the competitiveness of fisheries areas.
- Restructuring and redirecting economic activities.
- Adding value to fisheries products.
- Supporting small fisheries infrastructure and services.
- Protecting the environment.
- Re-establishing the production potential in the fisheries sector when damaged by natural disasters.
- Promoting inter-regional and trans-national cooperation among groups.
- Acquiring skills and facilitating the preparation and implementation of the local development strategy.
- Contributing to the running costs of the groups.

PRIORITY AXIS V TECHNICAL ASSISTANCE

1 Technical assistance of the Commission (Novelty: networking of stakeholders referred to in axis IV).
2 Technical assistance of the Member State.

At the initiative of the Member State and/or on behalf of the Commission, the EFF may finance the preparatory, monitoring, administrative and technical support, evaluation and audit measures necessary for implementing this Regulation, subject to a ceiling of 5% of its total allocation. By way of exception and under duly justified circumstances, such ceiling may be exceeded.

These measures shall include:
- evaluations, expert reports, statistics and studies, including those of a general nature concerning the operation of the EFF,
- measures aimed at the partners, the beneficiaries and the general public, including information measures,
- dissemination of information, networking, awareness-raising, promoting cooperation and Exchange of experiences,
- installation, operation and interconnection of computerised systems,
- improvements in evaluation methods and the Exchange of information on practices in this field
- establishment of trans-national and Community networks, with a view to encouraging the Exchange of experience and best practices.

NEW SYSTEM

- Strategic approach: National Strategic Plan.
- Simplification of programming and procedures.
- A single Operational Programme at the National level.
- Monitoring of priority axes.
- Consistency with the financial prospects, the Community policies and other Funds.

The EFF is no longer part of the group of Structural Funds, but the common principles of the Structural Funds were maintained, like several-years' programming, partnership, co-financing, subsidiarity, proportionality, shared management and resources concentration.

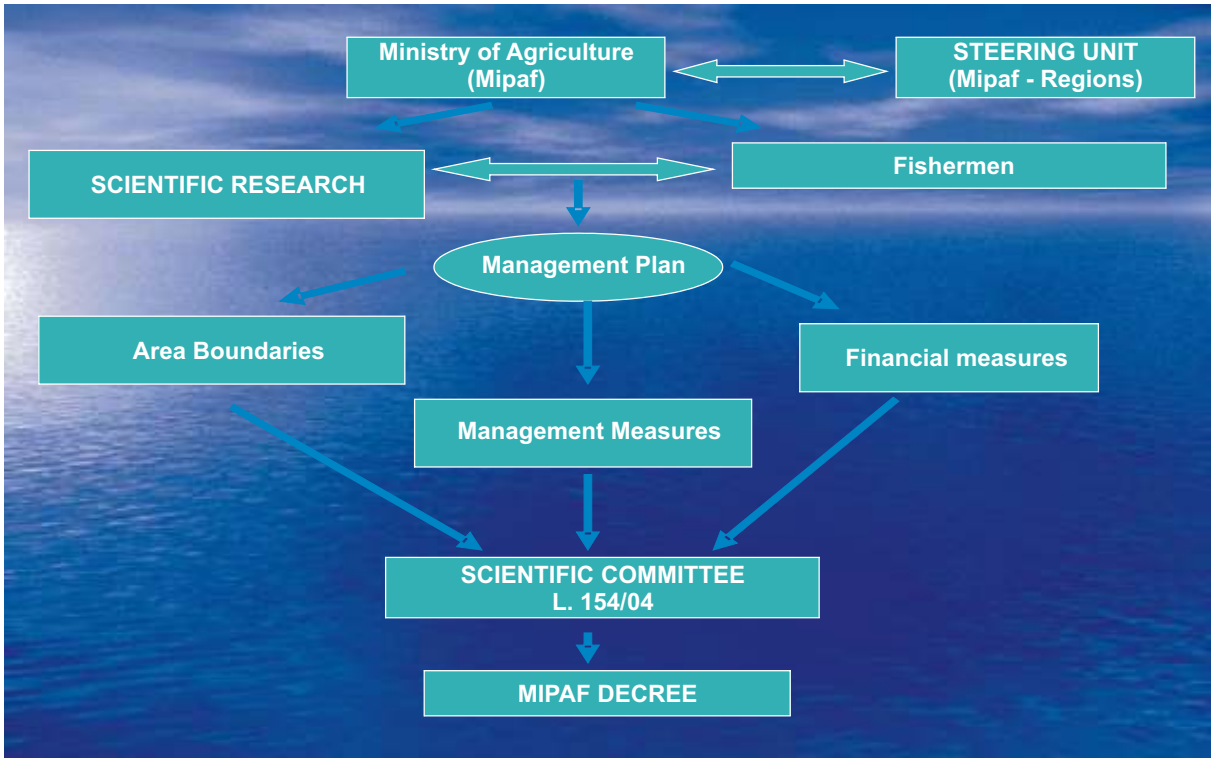

Fig. 1. CFP approach

The flow chart in this figure, that summarises the new approach of the CFP which is definitely based on fair equilibrium between sustainable exploitation of the natural resource and the fishing effort, highlights the fundamental role of scientific research in the study of resources, and the role of

fishers in defending them. It is then a new alliance: practicing fishery, preserving both the common resource and the quality of the coastal marine environment. Fisheries science and economics work in tandem seeking to meet both the requirements of the fishery resources survival and of fishers' revenue.

The bottom-up methodological approach introduced by the European Union gives evidence of a highly democratic decision-making process and allows sharing the contents and programmes that link the economic interests to environmental matters, to culture and local traditions, to the quality of fishery products and agri-food products peculiar to the territory, and to the environmental and oenogastronomic tourism.

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THE WATER RESOURCES PROTECTION PLAN OF REGIONE PUGLIA

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INTRODUCTION

The ***Water Resources Protection Plan of Regione Puglia***[1], by retracing the programming and protection lines set out in the legislative decree 152/2006 that transposes the Water Framework Directive 2000/60, represents the "*master*" tool of water governance at the regional territorial planning level, a dynamic knowledge and programming means intended for the protection, management and sustainable use of water resources.

The Water Resources Protection Plan of *Regione Puglia* represents the latest instrument that reorganizes and updates knowledge and tools on the protection of the regional territory and, actually, it replaces the old *Piano di Risanamento delle Acque* (Water Resources Reclamation Plan) of 1983 developed to implement the Law 319/76. The substantial changes introduced in the regulatory framework of this sector by the Legislative decree 152/99 and the transposition of the Community Directive, have required huge efforts for updating quite significant planning tools in view of the exceptional socio-economic-environmental situation in general, and of water in particular, of our territorial context.

This is an ambitious project that introduces significant innovatory themes that have come to light at the Community level, and takes them as reference strategies.

The first aspect refers to the establishment of **integrated and synergic protection of water resources quality and quantity**, in view of achieving a sustainable water use that will allow balancing water availability and the requirements of the Community.

The second aspect refers to the introduction of **environmental quality objectives** as guiding tools of the protection action, which usefully move the focus of our attention from the control of a single waste to all the polluting events affecting the water body. The reclamation action is thus based on the adoption of a "prevention" approach, which is specifically targeted to reduce pollutant loads according to the specific requirements and use of each body of water and shall thus measure, each time, the effects of the scheduled actions.

Finally, another prominent aspect is the introduction of adequate **monitoring programmes**, of both the quality and quantity of water bodies, and of the effectiveness of the scheduled interventions.

STRUCTURE OF THE WATER RESOURCES PROTECTION PLAN

The Water Protection Plan started up with a targeted and structured data acquisition activity to describe our territory (climatic, hydrographic, hydrological, geological, geomorphological, hydrogeological, naturalistic and socio-economic features), identify the existing water bodies and characterize them in quality and quantity terms, based on accurate analyses of the pressures acting therein.

The Plan subsequently identified a set of actions and measures to be adopted to face the most outstanding criticalities, as resulting from the exploratory phase, and established the monitoring networks for surface and underground waters[2], these being fundamental tools for acquiring dynamic knowledge of the territory and checking the implementation of the projected measures.

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[1] The Project Plan was adopted by the Regional Executive, pursuant to art.121 of the legislative decree152/06, by the resolution No 883 of 19 June 2007 (published in the BURP - Official Bulletin of Regione Puglia - No 102 of 18 July 2007). The whole documentation can be consulted on the Internet website of *Regione Puglia* - *www.regione.puglia.it*.

[2] The Projects "Quality and Quantity Monitoring System of underground water bodies of *Regione Puglia*" and "Quality and Quantity Monitoring System of surface water bodies of *Regione Puglia*" were approved by the Delegate Commissioner for Environmental Contingency by the decree No 219 of 1 August 2003 and by the decree No 76 of 23 April 2004, respectively.

DESCRIPTION OF THE APULIA REGION TERRITORY - ANALYSIS OF PRESSURES

The Apulia Region territory presents a hydrological-environmental situation characterized by scarce and unevenly distributed surface water resources.

Some watercourses are present in the northern part falling in the province of Foggia - Fortore, Candelaro, Cervaro, Carapelle and Ofanto rivers, whereas the remaining part of the Apulian territory is crossed by a complex hydrographic network, sometimes covering large endorheic areas that discharge into the deep karst aquifers. Underground water reserves have thus a huge strategic value to our Region, since in some parts of our territory they are the only existing authoctonous resource.

Such a condition is often exacerbated by climatic factors characterized by scarce rainfall seasonal regime and increasing desertification caused by the current climate change and strictly related to the land use by humans, which is not always a sound one.

Based on the acquired data and the hydrogeological studies carried out for the drafting of the Water Protection Plan, the surface and underground water bodies present on our territory were identified.

The next step was to assess “pressures”, namely the processes and phenomena caused by anthropogenic activities, which are not always territorially friendly and which affect the water quality-quantity in a point and diffuse manner, and consequently impinge upon the possibility for the community to use water resources.

This wide and structured environmental analysis activity results in a large set of indicators to describe the environmental state and that could provide elements and matrixes for assessing “responses” in terms of “measures” and “actions” to be implemented on the territory.

Analysis of pressures. Impact on the water resources quality

In order to assess the anthropogenic pressure operating on the quality of aquatic ecosystems, both the point sources (outlets of the treatment systems of urban conglomerations and individual settlements in the municipal and productive domain, and rainfall waters that are oftentimes directly discharged into the subsoil) and the diffuse sources (use of fertilizers and plant protection products in agriculture, and in animal husbandry to a lesser extent, released into the soil and conveyed to the groundwater) were considered.

In particular, referring to **point loads** arising from municipalities, the municipal treatment plants were assessed in terms of BOD_5, Phosphorous and Nitrogen loads, expressed in tons/year, for the different types of wastewater outlets.

An assessment was made of the load reduction in the relevant receiving water bodies, as resulting from the interventions on the treatment systems and the sewage networks - many of which in course of implementation and/or being foreseen. The estimated value is a 64% reduction for BOD_5, 40% for phosphorous and 45% for nitrogen.

The recognized need of protecting aquifers and the lack of water streams over more than 60% of the regional territory, jointly with subsequent primary rank provisions, have led us to envisage no discharge into the subsoil (that was a serious sanitary and environmental problem in 2002 due to the poor quality of treated wastewaters.) and possibly discharging treated waste waters into unimportant water streams (ravine *Lame)* or onto the soil (through draining ditches).

As for **diffuse sources**, the nutrient concentrations (nitrogen and phosphorous) and plant protection products strictly related to agricultural land use were considered. Taking account of the crops grown, of the soil peculiarity (shallow soils with marked karst phenomenon), of the climatic characteristics, a simulation model was established. Its results, together with the field monitoring data, allowed estimating the average annual concentrations of pollutants in seepage and runoff waters.

The situation resulted to be globally positive with very few examples of exceedance of the limits set out by regulations (50 mg/litre) in the proximity of intensively cultivated areas. Therefore, in compliance with the Directive 676/91/CEE the *Nitrate Vulnerable Zones* from *agricultural sources* were designated and the corresponding *Action Plan* was prepared.

Analysis of pressures. Impact on the water resources quantity

Surface and underground waters are subject to intense overexploitation because of indiscriminate abstraction for irrigation, industrial and municipal uses.

The study on the present state of water resources use in Apulia was carried out by processing the available data on: the type of source (surface, underground and spring waters), the origin (regional and extra-regional), the use (municipal, irrigation and industrial), the territorial distribution.

In 1999 Apulia region used **1,500 Mm^3** of water, of which:

1) 37% (546 Mm^3) for ***municipal uses,*** mostly withdrawn from extra-regional sources, and hardly 23% from regional sources exclusively consisting of underground water;
2) 53% (812 Mm^3) for ***irrigation,*** almost exclusively withdrawn from the regional underground water;
3) 10% (142 Mm^3) **for *industry,*** 59% of which is withdrawn exclusively from the regional underground water.

The hydrogeological budget (both for the soil and the subsoil[3]) estimate was performed - which allowed identifying portions of aquifers subject to stress because of the unbalance between abstraction and recharge - and quality of aquifers was assessed also in the face of the existing anthropogenic activities[4].

Analysis of pressures. Combination of factors on the water resources quality and quantity

Human factors often combine their effects on both the quality and quantity of the resource, superimposing the respective effects and acting “in a synergic manner”, sometimes negatively and aggravating the resulting effect, sometimes with each mitigating the severity of the other. A tangible example of this combined effect, quite critical to our regional territory, is ***saltwater intrusion in coastal aquifers****,* which deserves some further insight.

In a coastal aquifer - partially or totally bordered by the sea - fresh water is less dense and floats upon saline sea waters. The aquifer thus has the sea level as bottom level.

Waters circulating in a coastal karst aquifer flow to the sea through diffused or concentrated springs. The mouths of these concentrated springs become easy ways for the inland penetration of sea waters when the aquifer is depressurized due to overexploitation, thus causing the fresh water of the aquifer to mix with saline sea water and subsequently become salinized.

Should overexploitation conditions continue, these cycles would follow one another until the whole aquifer would become saturated with salty water, in the next 250 years; but, well before such occurrence, the salinity level in underground waters would be so high to make them inadequate for any use.

In addition, the salt content of the water abstracted in the coastal strip is strictly related to the well penetration in the aquifer and the abstracted discharge. Modern drilling technologies allow reaching great depths at lower costs than in the past, thus making abstraction wells increasingly deeper to abstract more water.

Therefore, a fundamental factor for limiting saltwater contamination is the level at which wells are placed below the mean sea level[5].

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[3] *The soil budget,* in its simplest form, was made by subtracting evaporation loss and runoff from the total monthly rainfall and the supplied irrigation water; *the subsoil budget* was obtained by subtracting the water abstracted for irrigation, municipal and industrial uses from the natural recharge.

[4] The major aquifer recharge areas, *characterized by zero or negligible anthropogenic impact under hydrogeological equilibrium conditions* are located in the area of Upper Murgia and the central areas of the Promontory of Gargano.
The *significant anthropogenic impact with considerable effect of use on the availability of the resource as manifested by significant water stress factors*, refers to the northern coastal strips of Gargano (Lesina lake and Piana di Carpino), the central and south-eastern areas of the shallow aquifer of Tavoliere, the aquifer of Murgia (Trani, Margherita di Savoia, Canosa; area south-east of Bari), the Ionian arc of Taranto and the central and southern portion of the Salento aquifer.
The areas on the northern-western margin of the shallow aquifer of Tavoliere are characterized by *a negligible anthropogenic impact, but with the presence of hydrogeological complexes with intrinsic characteristics of scarce water potential.*

[5] Already at the time of the *Piano di Risanamento delle Acque* of *Regione Puglia* (early in the '80s) the risk of increased overexploitation had been brought to our attention and, as a remedy, a sharp reductions in abstraction had been suggested through a hard-hitting struggle against illegal abstraction and comprehensive and integrated management of available water resources: the objective of these actions was intended to be the achievement of a safety threshold in the average abstracted discharge, equal to 6 m^3/s, against an estimated value of 14 m^3/s that undoubtedly exceeds the yearly recharge.

The analysis of the cross-sections relative to salt content distribution shows that the thicknesses of the portion of aquifers where fresh waters circulate have reduced: at a depth as shallow as 50 m below the sea level all the central area of Salento peninsula is permeated with waters having a salinity higher than 1 g/l, the same as in a wide coastal strip in Bari area. At a depth of 100 m below the sea level the only - very scarcely extended - areas with waters of a salinity lower than one gram per litre are found close to Murgia hills and inland of Otranto.

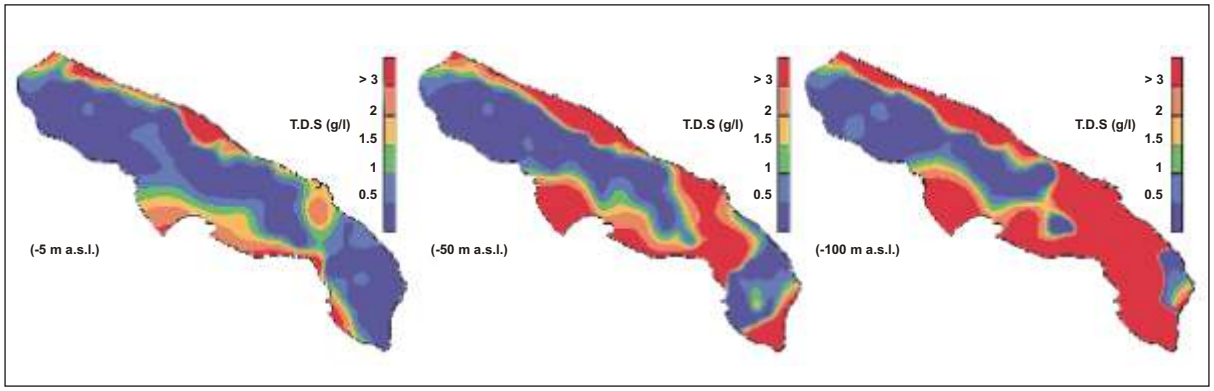

Fig.1. Salt content distribution of waters circulating in the karst aquifers at 5 - 50 - 100 m below the mean sea level

This process can only be stopped by reducing its causes, namely by curbing water abstraction, not to damage the activities that rely upon underground water, but to ensure long-term sustainability in the use of the resource.

In addition to identifying the areas where groundwater overexploitation has to be curbed, objective criteria had to be identified to quantify such reductions - like those included in the safeguard measure which take account of the fact that “perennial availability of the resources is possible if abstracted discharge doesn't exceed the average long-term availability”.

PROGRAMMES OF MEASURES

Following the general strategies and the indications resulting from the exploratory phase, to optimally protect and manage the water resources of the region, the Protection Plan contains specific programmes of measures that add up to the programmes already started and/or financed, for achieving the objectives set out in the regulations in force:

- Measures aimed at providing information on the Plan implementation, and especially at raising awareness on water saving and the sound use of water in the municipal, agricultural and industrial sectors;
- Measures for environmental infrastructures and requalification, aimed at controlling pressures and improving active management of water resources, in the two-fold quality-quantity view pursued by the Water Resources Protection Plan;
- Measures aimed at the progressive reuse of wastewaters and rainfall waters, as substitute resource;
- Measures for setting up and managing the monitoring systems of water bodies;
- Measures concerning the formalization of technical-management rules and measures (procedures), in addition to measures for the qualitative up-grading of the organizations involved in the implementation of the Plan objectives.

The cognitive analysis of the state of water resources in our region has highlighted the criticalities present on the territory, especially in underground waters subject to depletion and salinization, such to make it necessary to adopt, together with the Water Protection Plan, “**preliminary conservation measures**” on the aspects for which earlier application of the protection measures set out in the planning and programming instrument is urgent and indispensable.

The measures for the **Protection of Underground Waters Quantity and Quality** state the criteria and rules for the release/renewal of permits for water abstraction from groundwater, in order to reorganize water abstraction permits according to the different water bodies.

a. In the Areas *affected by saltwater contamination,* in order to combat sea water intrusion and salinization of karst coastal aquifers depressurized as a result of overexploitation, the following is established:
   - no new permits for agricultural/industrial use are issued
   - technical instructions for the renewal.

b. In the *Areas under water quality-quantity protection,* in order to protect the areas subject to overexploitation potentially prone to increase sea water intrusion, technical instructions are provided for the issue of new permits and for their renewal.

c. In the *Areas under water quantity protection,* in order to protect the area of Tavoliere plain that are highly compromised because of overexploitation, it is set out that no new permit for irrigation, industrial and non-potable municipal uses shall be issued.

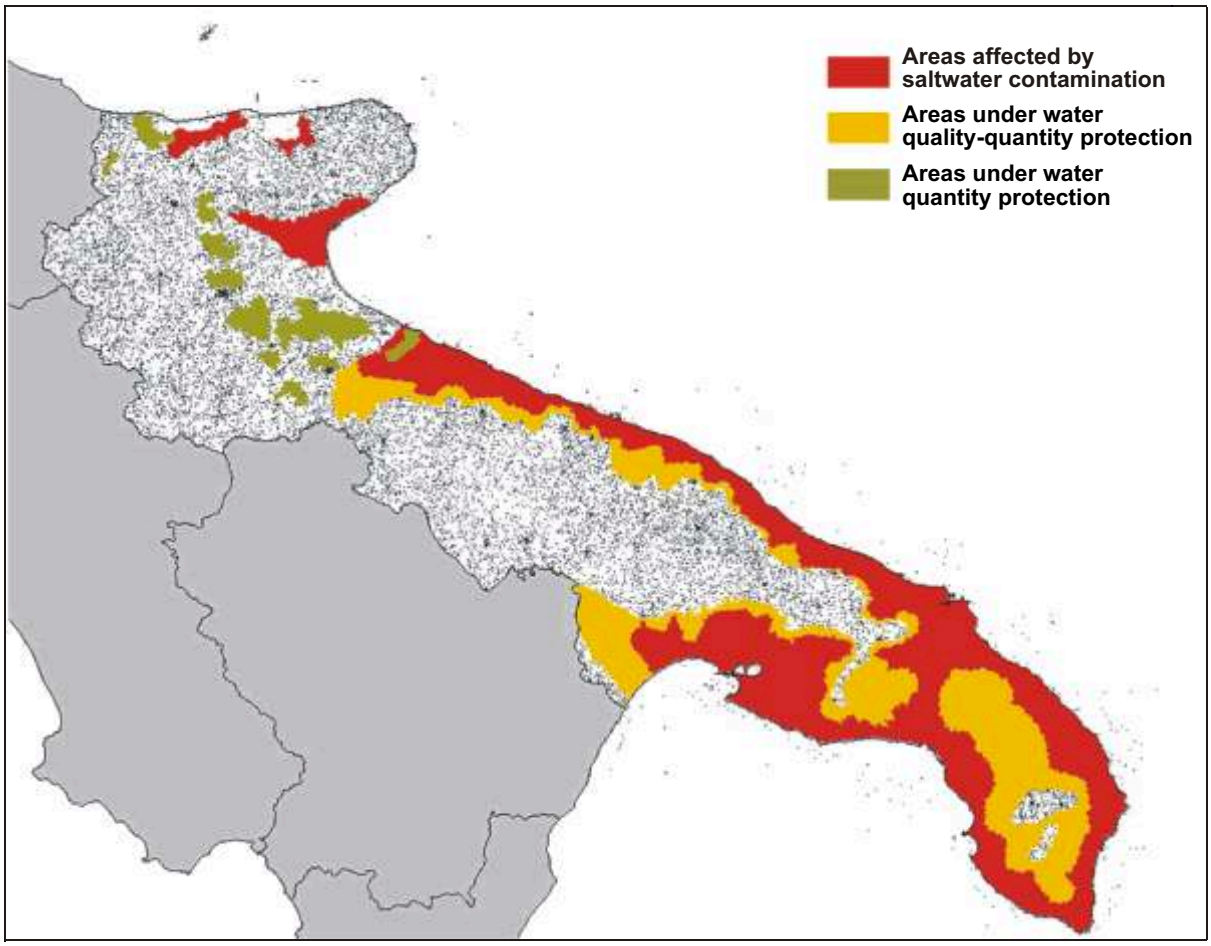

Fig. 2. Conservation measures *Areas under underground water quality and quantity protection*

The measures for ***Special Hydrogeological Protection Zones*** regulate the activities admitted in the physical-geographic portions of the territory worthy of protection in that they are of strategic value for the recharge of underground water bodies[6].

[6] For further detail on Conservation Measures, refer to Annex 2 of the resolution of the Regional Executive No 883 of 19 June 2007 (published in the BURP No 102 of 18 July 2007 and that can be consulted on the Internet website of the *Regione Puglia*).

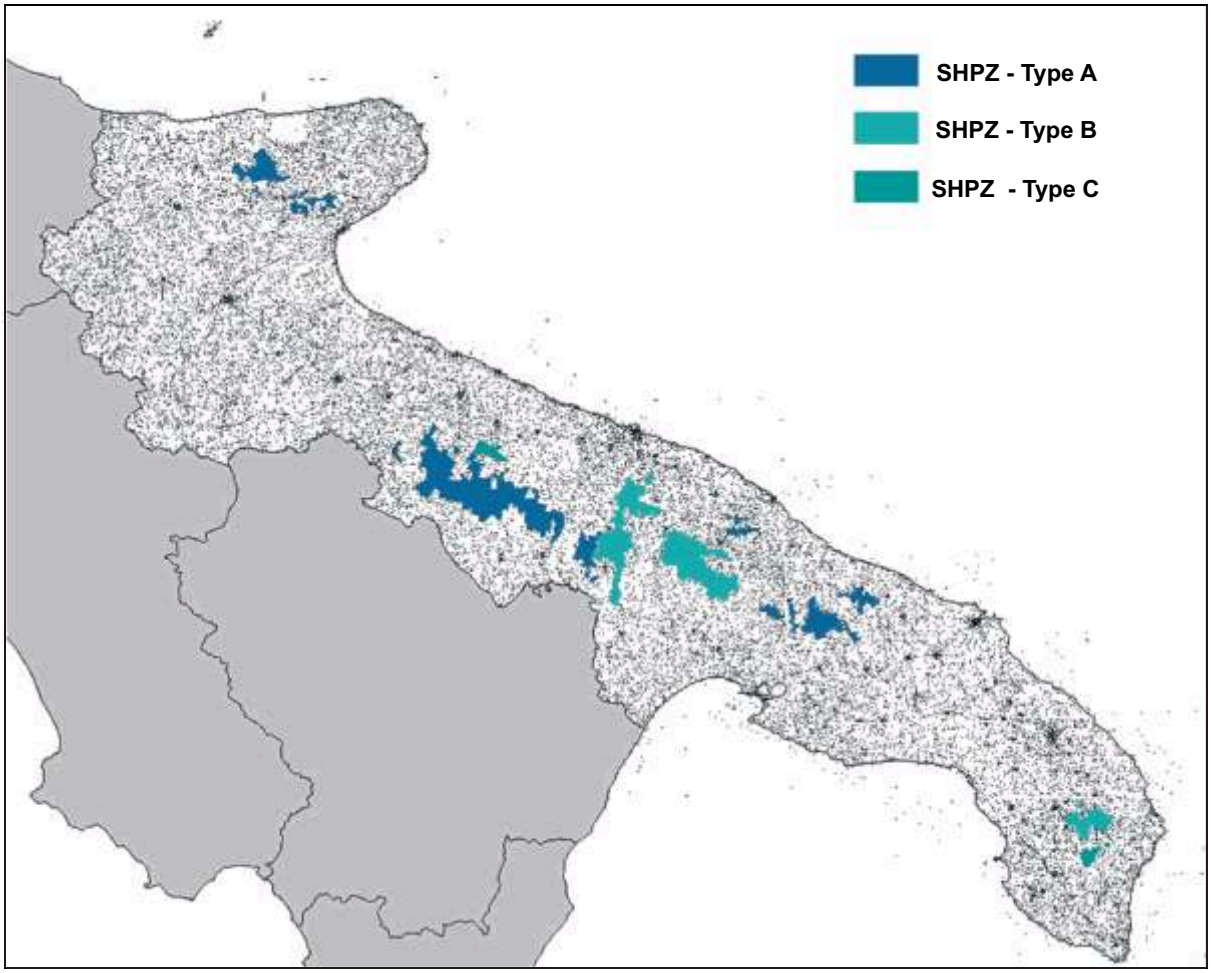

Fig. 3. Conservation measures - Special Hydrogeological Protection Zones (SHPZ).

On one hand, it is absolutely urgent to define and implement measures capable of effectively combating groundwater depletion, on the other hand, such measures should not jeopardize the local development potentials, and relevant costs should be properly shared by the various sectoral water users.

Economic water use efficiency should be introduced, namely we should move from the *requirements-based* concept to the *minimum standard consumption* concept for different uses.

Implementing an abstraction-curbing policy is crucial. This should be done not only through limiting water abstraction, but also through training to water saving (by the adoption of public water saving policies that can influence behaviours non always sustainable of our community), through seeking the most advanced technologies (for instance, by installing water saving devices, as flow limiters, trickle irrigation systems, and so forth), and especially through alternative resources, through systematic recovery and reuse of waste and rainfall waters.

In Apulia region, some plants are already equipped, or are going to, with refinement systems that release water to be reused even in agriculture, and for many of them an irrigation scheme equipped for receiving treated waters is already present.

The operation of these 35 plants would allow recovering 92 Mm^3 of water in a single irrigation season. Considering also that it is possible to boost all the plants already equipped for the tertiary treatment with a refining station, in one year a volume of more than 147 Mm^3 could be recovered, such to fully meet, for instance, the industrial water requirements in the region.

Therefore, reuse really is a *substitute water resource*, especially in view of the existing fields of application of treated water: irrigation (in agriculture and for urban green areas), non-potable municipal use (road washing, supply to heating/cooling systems, water supply to fire-fighting systems, toilet flushing systems, and so forth), industrial use (water for fire-fighting, process water, wash water and water for heating cycles in industrial processes).

The ambitious but strategically indispensable objective of the Water Protection Plan is to reduce consumption by 20% by 2015, and the Regional Government is already implementing the following activities:

- Defining a regional regulation for the recovery/reuse of waste waters.
- Operating all the adequate existing plants.
- Completing the works for operating the plants in need of structural adjustments,
- Foreseeing further refining plants for the implementation of treatment systems to the service of urban conglomerations that discharge into the soil or into unimportant surface water bodies (ravine *lame*),
- Acting on industrial activities by introducing better technologies,
- Promoting alternative objectives for the reuse of the recovered water (dual piping networks, fire-fighting),
- Promoting awareness-raising campaigns for a sustainable and sound use of water.

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