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A contribution to the implementation of ICZM in the Mediterranean developing countries

Pino González-Riancho*, Marcello Sanò, Raúl Medina, Oscar García-Aguilar, Jurgi Areizaga

Environmental Hydraulics Institute "IH Cantabria", Universidad de Cantabria Avda. de Los Castros s/n, 39005 Santander, Spain

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ABSTRACT

The purpose of this paper is to assess the level of implementation of Integrated Coastal Zone Management (ICZM) principles in the Mediterranean developing countries at the moment of signing the protocol on ICZM for the Mediterranean, in the framework of the UNEP Mediterranean Action Plan of the Barcelona Convention. This assessment is based on the results of two advanced seminars on ICZM promoted by the Azahar programme of the Spanish Agency for International Cooperation for the Development (Ministry of Foreign Affairs and International Cooperation). The contribution of the participants of the seminar, who are representatives of national agencies related with ICZM in different Mediterranean countries, have been collected through a questionnaire including: (i) a ranking of the main coastal sectors and the main coastal issues of each country; (ii) significant initiatives for the sustainable development of the Mediterranean coastal zones; and (iii) the evaluation of the ICZM progress. The state of the coast, the level of implementation of ICZM and the main problems faced to apply it, have been detected for each country. None of the consulted countries have a full implemented integrated coastal zone management, the major problems being: (i) the lack of financial commitment for the implementation of ICZM; (ii) the lack of an assessment and monitoring system; (iii) the lack of knowledge regarding the coastal system; (iv) the lack of qualified human resources; and (v) the lack of public participation and administrative integration strategies based on information. From these conclusions, some recommendations to improve ICZM are also provided. The work presented in this paper is the starting point to assess the evolution and the reference from which ICZM will be improved through the protocol on ICZM for the Mediterranean.

1. Introduction

The Protocol on Integrated Coastal Zone Management in the Mediterranean, within the framework of the Barcelona Convention, was signed at the Conference of the Plenipotentiaries on the ICZM Protocol that took place on 20–21 January 2008 in Madrid. Fourteen Contracting Parties of the Barcelona Convention signed the Protocol: Algeria, Croatia, France, Greece, Israel, Italy, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria and Tunisia. All other Parties announced to do so in the very near future [1].

This paper aims to assess both the state of the coast and the level of ICZM implementation in the developing Mediterranean countries at the time of signing the ICZM Protocol, being both assessments based on the contributions of several coastal management representatives from different Mediterranean developing countries. The assessment of the state of the coast is based on the methodology applied by Spain [2] to carry out the Stocktaking of Actors, Laws and Institutions proposed by the Recommendation 2002/413/EC concerning the implementation of ICZM in Europe [3]. The assessment of the level of ICZM implementation has been carried out through an indicator set to measure the progress in integrated coastal zone management in Europe, proposed by Pickaver et al. [4] (from now on ICZM Progress Indicator). The application of the ICZM Progress Indicator to the Mediterranean developing countries is a useful contribution to the knowledge of the current situation of ICZM in the Maghreb, the Middle East and South-Eastern Europe, providing the possibility to compare the results obtained for this region with what was obtained for the European countries by Pickaver et al.

The data collection to carry out this work has been possible through the participation of these Mediterranean coastal managers in two advanced seminars of the Azahar Programme promoted by the Spanish Agency for International Cooperation and Development (AECID) and organized by the University of Cantabria between 2005 and 2007. Azahar programme focuses on three major Mediterranean subregions, the Maghreb, the Middle East and South-Eastern Europe, being the countries involved in these seminars Morocco, Algeria, Tunisia, Mauritania (included in Azahar

* Corresponding author. Tel.: +34 942 201810; fax: +34 942 201860.
E-mail address: grianchop@unican.es (P. González-Riancho).

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programme even if it is not a Mediterranean country), Egypt, Palestinian Territories, Jordan, Lebanon, Syria, Bosnia-Herzegovina, Montenegro (formerly Serbia-Montenegro till the independence of this last one in 2006) and Albania. As a result, 44 participants from 12 Mediterranean developing countries attended these two Azahar seminars. The seminars are oriented to technical coastal experts and managers representatives from the different administrations (see Table 1) of the Azahar Mediterranean countries. The attendees must have a level of education equivalent to a major technical degree related to engineering, oceanography or geology, or else they must be coordinating coastline management teams incorporating personnel with the aforesaid qualifications.

Their contributions were collected through a questionnaire based on the work carried out in Spain in order to meet the Recommendation 2002/413/EC concerning the implementation of ICZM in Europe, which encourages the European countries to develop a stocktaking of the actors, laws and institutions involved in coastal management, including the analysis of the main coastal issues through the perceived diagnosis of the stakeholders, and to develop a national strategy on ICZM according to the results of the stocktaking. The contributions of the Seminar participants are analyzed and presented in the following chapters.

2. ICZM in the Mediterranean region

The Mediterranean is a perfect illustration of the global problem of sustainable development. It is a complex region that gathers many different ecosystems and landscapes characterized by a very high level of biodiversity. It is the crossroad between three continents, Asia, Africa and Europe, with very different cultural backgrounds, forms of governments and levels of development. The human population of the Mediterranean is distributed along the coast and concentrated in coastal cities, and this trend is increasing. It is one of the most important tourism destinations worldwide and it has a strategic importance for the transportation of goods and for energy supply. Finally, the development of many different civilizations along its coast has left an important cultural heritage that needs special attention for its conservation [5]. The socio-cultural, economic and territorial disparities, the persistence of conflicts and the increases in pressure on the environment, prove that the Mediterranean region is not achieving a sustainable development. There is a need, both at the national level of each state and at the Mediterranean regional level, for a coordinated and integrated effort of the different coastal stakeholders – public administrations, international organisms, companies, coastal experts, NGOs and the civil society – to achieve a sustainable development of our coastal areas, especially concerning tourism development. ICZM is a chance and a challenge for the Mediterranean countries to reach a balanced and sustainable management of the coastal system and its resources.

Nowadays, it is widely known that the implementation of ICZM is a medium-term, complex, multidisciplinary and iterative process, which needs to be gradually established, adapted and improved. This process includes several steps; from the moment in which a coastal management process begins to the point when the ICZM is completely and successfully established. It is usually represented by the ICZM policy cycle (Fig. 1) which slightly varies between authors but always has the basic idea of the initiation–planning–implementation–evaluation steps. Each cycle could be considered as an ICZM program in itself and is limited by the geographic area covered and by the number of stakeholders and economic sectors involved. Once one ICZM program is successfully accomplished, it can become wider in scope [6].

Almost 40 years after the first launch of ICZM principles in USA (Coastal Zone Management Act, 1972), Europe and the Mediterranean region seem to have a real intention and the opportunity to include these principles into their legal–administrative system and are finally establishing a legal instrument to implement them. In 1975, 16 Mediterranean countries and the European Community adopted the Mediterranean Action Plan (MAP) [8], the first-ever Regional Seas Programme under UNEP's umbrella. In 1976 these Contracting Parties adopted the Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention) [9]. Today, more than 30 years later, the Barcelona Convention and MAP are more active than ever, being nowadays 22 Contracting Parties. Seven protocols addressing specific aspects of Mediterranean environmental conservation complete the MAP

Table 1
Institutions attending to the seminars on ICZM.

Country	Institution
Albania	Ministry of Spatial Planning and Tourism. Technical Secretariat of Water National Council
	Ministry of Environment, Forest and Water Management
Algeria	Ministry of Land Management and Environment
	Ministry of High Education and Scientific Research
Bosnia-Herzegovina	Ministry of Economy, Entrepreneurship and Agriculture in Herzegovinian-Neretvan Canton Management for Water Sector
	Adriatic Sea Hydrographic Area. Water Sector
Egypt	Ministry of Water Resources and Irrigation. Coastal Research Institute
	Ministry of Water Resources and Irrigation. Shore Protection Authority
	Ministry of State for Environmental Affairs. Egyptian Environmental Affairs Agency
	Governorate of Matruh. Physical Planning Department
Jordan	Ministry of Environment
Lebanon	Ministry of Public Works and Transport
	Ministry of Interior and Municipalities Municipality of Damour
Morocco	Ministry of Land Management, Water and Environment
	Agency of Loukkos Tétouan Hydraulic Basin. Water Resources Planning Department
	Ministry of Agriculture, Rural Development and Maritime Fishing
Mauritania	Ministry of Rural Development
	Ministry of Environment. Service of scientific coordination for the direction of protected areas and the littoral
Palestinian Territories	Environment Quality Authority
	Ministry of Public Works and Housing. Research and Studies Department
	Environmental Quality Authority and Gaza Strip. Marine and Coastal Department
	Al-Quds University. Faculty of Science and Technology. Department of Applied Environmental and Earth Studies
Syria	State Planning Commission
Tunisia	Agency for Littoral Protection and Management (APAL)
	University of Sfax. School of Science

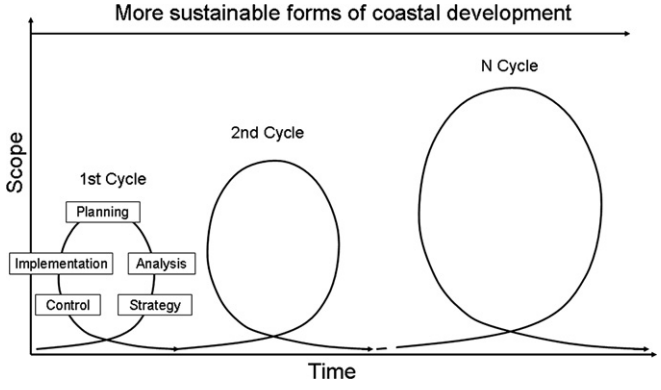

Fig. 1. ICZM policy cycle. Adapted from Sanò et al. [7].

legal framework; the last one, concerning ICZM, is the objective of this paper.

The Protocol on Integrated Coastal Zone Management, supported by two previous European initiatives on ICZM, the European Demonstration Programme on ICZM (1996–1999) and the European Recommendation for ICZM implementation (2002), was adopted in Madrid on January 2008. This is the seventh protocol coming to complete the set of legal instruments of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its protocols (Barcelona Convention). This protocol is the response to the need for a binding legal instrument for the Mediterranean region. Fourteen Contracting Parties of the Barcelona Convention signed the protocol at the concluding session of the Plenipotentiaries Conference, these are the following: Algeria, Croatia, France, Greece, Israel, Italy, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria and Tunisia. The protocol is now open for signature by all Contracting Parties from 21st January 2008 to 20th January 2009.

This paper aims to analyze the status of the Mediterranean developing countries on the implementation of ICZM principles at the moment of signing the Protocol on ICZM. This analysis is an opportunity to start the continuous and periodic monitoring of the progress on ICZM that each country or region should develop in order to conduct an adaptive, iterative and learning-based process, as suggested in the definition of ICZM.

To understand the relation between the MAP, the Barcelona convention and the Azahar priority countries attending to the mentioned advanced seminars and whose contributions will be presented in this paper, the following figures (Figs. 2 and 3) are presented. The left hand side shows the countries, which signed the Barcelona Convention and on the right hand side those countries which are considered Azahar priority countries. The Azahar countries are the non-European and developing Mediterranean countries except Libya, Israel, Turkey and Croatia either for their development status or for political reasons. Mauritania is also included although it does not belong to the Mediterranean region. All the Azahar countries adopted the Mediterranean Action Plan and the Barcelona Convention, except Mauritania and Jordan. Although neither one of them belong to the Mediterranean Basin nor have they signed the Protocol on ICZM, Mauritania and Jordan will be included in the analysis due to the interest of the information given. It is necessary to mention that, although it was included, no representative from Montenegro attended the seminars.

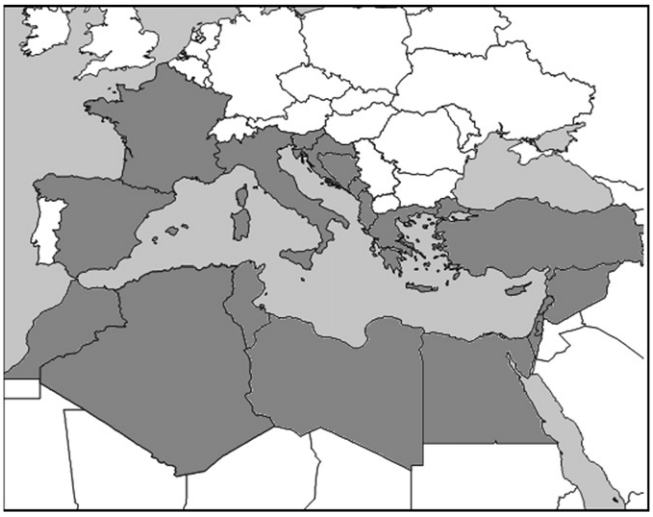

Fig. 2. Barcelona Convention countries.

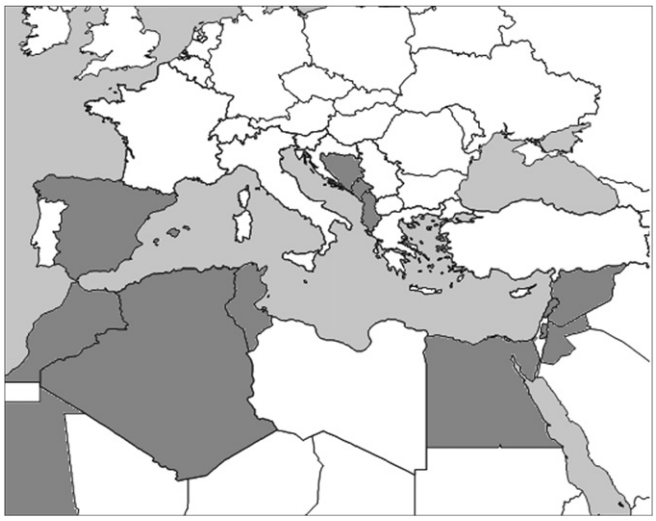

Fig. 3. Azahar Programme countries.

3. Methodology

The assessment alone of the ICZM progress in a country does not give a precise idea about the achievement of a sustainable coastal development, making it necessary to determine the consequent improvement on the state of the coast. The Indicators and Data Working Group (WG-ID) of the European ICZM Expert Group proposed, in 2003, using two sets of indicators: (i) an indicator set to measure the progress of implementation of ICZM (Progress Indicator); and (ii) a core set of 27 indicators, made up of 44 measurements, to assess sustainable development of the coastal zone (sustainability indicators) in Europe [10].

This chapter presents the methodology used to collect and analyze the information regarding the state of the coast and the progress on ICZM in the Mediterranean developing countries obtained from the attendees to the Advanced Seminars. The Progress Indicator applied is the one used by the WG-ID in Europe, proposed by Pickaver et al. On the other hand, the data source of this work made necessary the application of another, more user friendly, sustainability indicator, which represents a subjective assessment of the state of the coast and would complement the work carried out by the WG-ID.

The methodology applied is based on a specific questionnaire filled out by the participants of the Azahar advanced seminars. This questionnaire is organized in three parts, the first part gathers basic information about the person who fills the questionnaire, the second part collects information about the state of the coast and consists of open questions and rankings, and the third part is about the progress of ICZM and consists of Yes/No questions, as in the ICZM Progress Indicator.

3.1. State of the coast

To analyze the state of the coast of the different countries, the attendees were asked to fill in some open questions concerning: (i) the national agencies and ministries with responsibilities on the coastal zone; (ii) the laws affecting the coastal zone; (iii) the number of research centers and universities which work on coastal issues; (iv) the percentage of the budget for coastal management and coastal protection; (v) the percentage of area protected for nature, landscape and heritage conservation; (vi) the number of endangered coastal species; (vii) the percentage of built-up area by 5 km from the coastline; (viii) the percentage of

protected and defended coastline; and (ix) the percentage of second and holiday homes. Furthermore, the participants were asked to fill in two questions, one ranking concerning the importance of some economic sectors and the other the coastal problems. These two ranking questions are analyzed and explained in the following lines.

The attendees were asked to rank several economic sectors from the most important (1) to the less important (8) according to their influence on the economy, pressure on coastal environment and social awareness of coastal communities. This task had been carried out using Table 2. The sectors used are selected from the Recommendation 2002/413/EC on ICZM.

To complete this information with the perceived diagnosis of the state of the coast, the attendees were also asked to rank different coastal problems in their country from the most (1) to the least important (11) through Table 3.

Through these two tables an overview of the state of the coastal system is provided. This joint ranking constitutes a useful sustainable development indicator as it reflects the importance of each economic sector for the economic (economic relevance), environmental (coastal pressure) and social (social awareness) systems, establishing a relationship between these three coastal systems. It also shows, within a DPSIR framework, the relation between the "driving forces" (economic sectors), exerting a "pressure" on the environment, the "impacts" suffered by the coast which represents the "state" of the coast (coastal problems) and the "response" of the society (social awareness). It is a useful tool to understand the current state of the coastal zone and the interrelation between the three coastal systems through the collection of very little information. However, it is advisable to conduct this analysis with regular recurrence in order to understand the coastal trends and the evolution followed by each sector as a response to population growth.

3.2. Progress in ICZM

After analyzing the work carried out by several authors, such as Ehler (2003) [11], Olsen (2003) [12], Pickaver et al. (2004) or UNESCO-IOC Manuals and Guides (2006) [13], to measure the level of implementation of ICZM, the conclusion was that to do this, it is necessary to collect very specific information that may not be accessible to everyone, only to institutions directly involved in ICZM. The work presented in this paper has been carried out through questionnaires filled out by people of different backgrounds and professional profiles (coastal institutions and agencies, sectoral ministries with competences on coastal areas, coastal researchers, etc.) as well from different countries and cultures. The proper collection, processing and analysis of the information require the use of simple indicators based on representative questions as well as simple answers. For this reason, the indicator selected to analyze the results of the work presented in this paper is the ICZM Progress Indicator proposed by Pickaver et al. (2004) to measure the progress in the implementation of ICZM in Europe (ICZM Progress Indicator).

Table 2
Table to collect information about the importance of economic sectors.

Sector	Economic relevance	Coastal pressure	Social awareness
I. Fishing and aquaculture			
II. Transport			
III. Energy			
IV. Protection of species and habitats			
V. Cultural heritage			
VI. Tourism and recreation			
VII. Industry and mining			
VIII. Agriculture			

Table 3
Table to collect information about coastal problems.

Coastal problem	Rank
Fish stock diminishing	
Water chemical contamination	
Historical heritage degradation	
Unemployment	
Coastal erosion	
Coastal urbanization	
Sewage discharges	
Eutrophication	
Loss of coastal habitats	
Lack of coastal knowledge	
Unclear institutional responsibilities definition	

To apply the ICZM Progress Indicator to the Azahar Mediterranean developing countries and estimate the level of implementation of ICZM in each participating country, the attendees were asked to fill in 26 yes/no questions concerning the coastal management applied (decision making, planning, funding, instruments, reports, plans, strategies, administrative support, public information and participation, conflict resolution, monitoring, etc.). All these questions can be grouped into five phases of gradual ICZM implementation. This structure of questions and phases is shown in Table 4. The positive/negative answers of the participants to each of these questions shows the exact level at which coastal management is and how far it is from a full implementation of ICZM.

Pickaver et al. applied this indicator in Europe considering each action in two time periods to identify a trend through time, and in three spatial levels (national, regional and local) [4]. However, the work presented here considers each action only at the national level, due to the sociopolitical situation of the attending countries, and takes into account the time at which the questions were answered (2007) to provide preliminary information when signing the protocol as the starting point for a continuous assessment.

4. Results

The answers of the participants to the Azahar advanced seminars have been combined, compared, validated, filtered and statistically treated.

It is important to note that the information collected can be considered as especially representative due to the professional background of the seminars' attendees participating in the survey. Information coming from coastal professionals working in institutions with major responsibilities in the coastal space provides very valuable insight for current coastal management issues. This information is usually very difficult to gather, and highlights the unique opportunity offered by this training course in reaching this specific audience.

The results obtained from this combination of answers are presented in this section. The first chapter focuses on the analysis of the state of the coast and the second one is referred to the progress of ICZM in the Azahar Mediterranean developing countries.

4.1. Analysis of the state of the coast

To frame the results obtained from the analysis of the state of the coast and to have a preliminary global vision of the characteristics of the Mediterranean region, Table 5 compares the coastline

Table 4
Distribution of activities and phases for the assessment of the progress on ICZM (adapted from Pickaver et al. [2]).

Phase I. Non-integrated coastal management is taking place
a. Coastal management aspects are taking place in your country.
b. Decisions about planning and management on the coast are governed by general legal instruments.
c. Aspects of the coastal zone, including marine areas, are regularly and routinely monitored.
d. Planning on the coast includes the provision, where appropriate, for the protection of natural areas.
e. Funding is generally available for the implementation of coastal management plans.
Phase II. A framework for ICZM exists
f. Existing instruments are being adapted and combined to deal with planning and management issues on the coast.
g. Ad hoc ICZM demonstration projects are being carried out that contain recognizable elements of ICZM.
h. A formal "state of the coast" report has been written with the intention to repeat the exercise every 5 or 10 years.
i. A coastal management plan, embracing a long-term perspective, has been developed, with relevant issues and an implementation strategy drawn up and adopted.
j. An ICZM strategy (including the marine environment) has been produced which takes into account both the interdependence and disparity of natural processes and human activities.
k. A sustainable development strategy is in place which includes the precautionary principle and an ecosystems approach, and which treats coastal areas as distinct and separate areas.
Phase III. Vertical and horizontal integration exists
l. All relevant parties concerned in the ICZM decision making process have been identified and involved.
m. Sufficient human resources, with a specific responsibility for ICZM, are placed at each administrative level from national government to coastal municipality.
n. An adequate flow of relevant ICZM information from the national to the local authority, and back again, is reaching the most appropriate people at each administrative level.
o. There is sufficient support and involvement of the relevant administrative bodies, nationally, regionally, and locally, to allow and improve coordination.
p. Examples of best ICZM practice are available and being used for specific solutions, and flexible measures, to ensure the diversity of the Mediterranean coasts.
q. Scientific and technical information is being made available in an understandable form to lay people without losing coherence and validity.
r. Adequate mechanisms are in place to allow the general public to take a participative and inclusive (as opposed to a consultative) role in ICZM decisions.
s. Routine (rather than occasional) cooperation across local, regional, or national boundaries is occurring.
t. An efficient means to resolve conflicts between stakeholders is in place.
u. A comprehensive set of indicators is being used to assess whether or not the coast is moving towards a more sustainable situation.
Phase IV. An efficient, participatory, integrative planning exists
v. A long-term financial commitment is in place for the implementation of ICZM.
w. An assessment of progress towards meeting sustainability goals is being made continuously.
x. Monitoring on the coastal zone sees a positive trend towards greater sustainability of coastal resources, an improvement in the state of the coast and in coastal habitats and biodiversity.
Phase V. There is a full implementation of ICZM
y. All of the above actions have been implemented with problems areas given special attention.
z. Re-evaluation of progress in implementing ICZM begins again automatically.

length, the population densities, the Gross Domestic Product (GDP) and the Human Development Index (HDI) of the different countries.

From this table it is possible to conclude that there is a higher population density in coastal areas, with a consequent increase in the number of economic activities, urbanized areas, solid waste and wastewater discharges, conflicts for the existing resources and conflicts of competences between the different administrations. This situation justifies the need for an integrated approach in coastal management to connect and coordinate all the sectoral economic activities and objectives, all the coastal stakeholders and the sectoral administrations and policies at the national, regional and local level.

4.1.1. Economic sectors

Focusing again on the questionnaire and on the question of the economic sectors, the results obtained for the whole Mediterranean region are shown in Chart 1. The importance of each sector according to their influence on the economy of the country (economic system), pressure on the coastal environment (physical-ecological system) and on the social awareness (social system) is presented in this chart.

The most important sectors in the economy of the Mediterranean developing region are tourism and recreation, industry and mining, agriculture and fishing and aquaculture, being the first two also important in terms of pressure on the environment together with transport, and followed by fishing and aquaculture and energy. Concerning the social awareness, almost all the sectors have a social importance the most important being the protection of species and habitats, fishing and aquaculture and agriculture, and the less important industry and mining.

In this chart we must take notice of the social awareness in industry and mining, which is the lowest despite the fact that it exerts the highest pressure on the coastal environment. This could be explained based on its insufficient presence in these developing countries. On the opposite hand there are two sectors (protection of species and habitats and historical heritage), which present one of the highest social awareness although their contribution to their economy is located among the lowest values. These aspects are important because they indicate that these countries are very conscious about the richness of their cultural and natural resources, anyway it should be studied the national policies implemented in order to protect them and to promote their rational use and sustainable exploitation.

It is also possible to compare, for each specific country, the sectoral influence on the economy, the pressure on coastal environment and the social awareness. For example, Chart 2 shows the importance of the different sectors in Algeria: the most important sectors in terms of economy are industry and mining, energy and transport, the first two also being important in terms of environmental pressure, together with agriculture. The sectors with the most influence on the social awareness are protection of species and habitats, historical heritage, tourism and agriculture. Note that the most important sector in terms of pressure, industry and mining, has almost no social awareness associated.

Table 5
General vision of the Mediterranean countries.

Country	Coastline length [5] (km)	Population density [5] (inhabitants/km^2)		GDP [14] (millions of USD)	HDI [15]
		Country	Coastal regions		
Albania	418	108	152	9145	0.801
Algeria	1200	13	261	113,888	0.733
Bosnia-Herzegovina	23	78	51	11,396	0.803
Egypt	955*	66	200	107,375	0.708
Jordan	27	64	229	14,101	0.773
Lebanon	225	307	594	22,722	0.772
Mauritania	754	3	–	2713	0.550
Morocco	512*	40	159	65,405	0.646
Palestinian Territories	55	523	3083	–	0.731
Tunisia	1298	59	148	30,837	0.766
Syria	183	86	366	34,919	0.724

* only the Mediterranean coast considered.

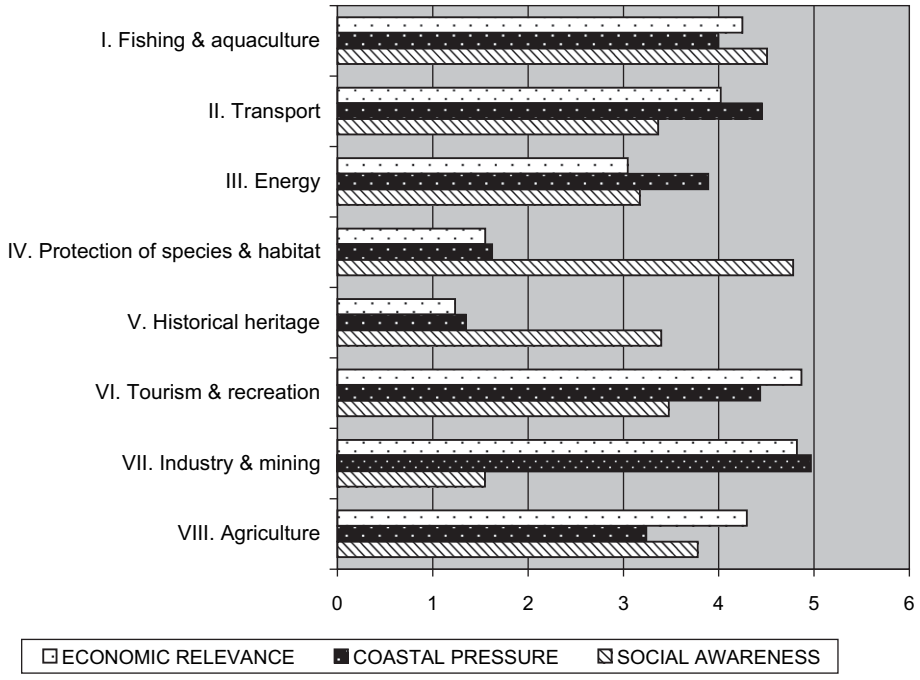

Chart 1. Mediterranean region: importance of sectors.

The influence of one specific sector on the economy, the pressure and the awareness in the different countries has also been analyzed. Chart 3 shows the importance of tourism and recreation for the different countries.

Tourism and recreation is a very important sector in the entire Mediterranean basin, especially for Spain or Italy in Europe or Tunisia and Egypt in Africa. This is shown in this chart due to its contribution to the economy of the studied countries. Nevertheless, it is noteworthy how the Middle-Eastern countries are more aware of tourism compared with the Maghreb countries, except for Algeria, which presents a high social awareness.

4.1.2. Coastal problems

In regards to the question of the coastal problems, which gives an idea of the perceived analysis of the attendees to the seminar, the results for the Mediterranean region are shown in Chart 4. The main perceived coastal problems in the Mediterranean region for the attendees are sewage discharges and coastal erosion followed by a fish stock diminishing, water chemical contamination and coastal urbanization. The problems considered less important are historical heritage degradation, eutrophication and unclear definition of institutional responsibilities.

This analysis has been conducted for each specific country in order to determine which problems are considered as priorities to be able to successfully manage them towards sustainability. An assessment of the global results for the Mediterranean region, while at the same time considering the specificities of each country, is presented in Chart 5. To understand this chart, for each coastal problem two things must be considered: the value given by the countries and the standard deviation related to the spread of these values amongst the different countries.

Chart 5 corroborates the conclusions extracted from Chart 4 concerning the importance of coastal problems. The problems identified as most important in the Mediterranean region obtained a high value and the ranking between them is given by the spread of values: the lower standard deviation the higher importance of

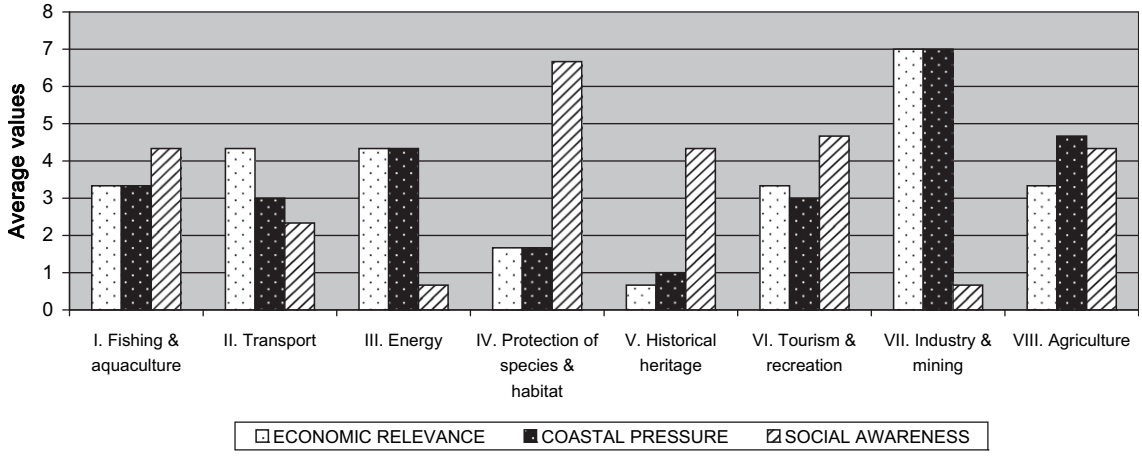

Chart 2. Algeria: importance of sectors.

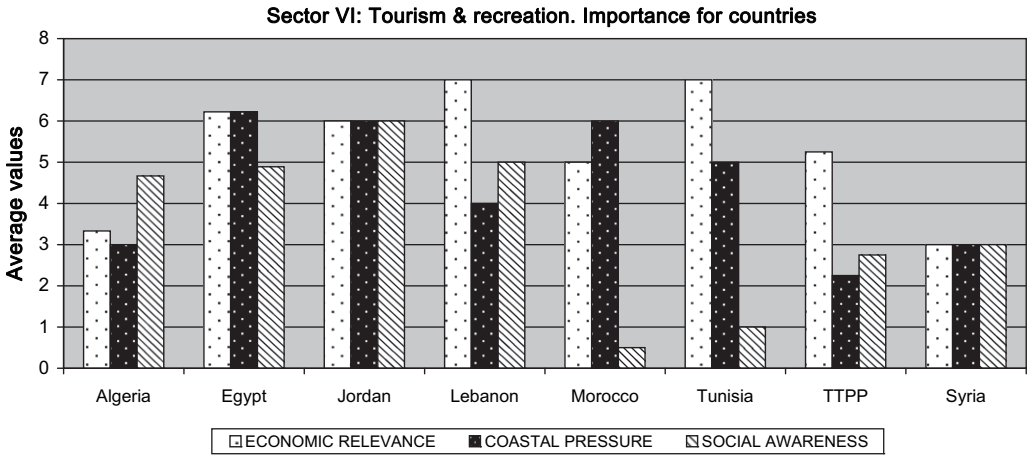

Chart 3. Tourism and recreation: importance for the different countries.

the problem. Sewage discharges, coastal erosion and fish stock diminishing are the most important problems due to their high value and low spread of data (all the countries valuated these problems as very important with the minimum value of 5). For this reason, coastal erosion is more important than coastal urbanization since for this last one, the data are more scattered (Mauritania gave it a very low value). In these problems, only Tunisia, Algeria and TTPP have valuated both problems similarly, recognizing the significant relationship existing between them.

Considering the specific results obtained, the most important problems for each country can also be extracted form this chart. Algeria, Lebanon and Syria highlight the water pollution as the most important issue giving the highest values to water chemical contamination and sewage discharges. This last issue is considered very important also for Morocco and Egypt. Tunisia, Palestinian Territories Mauritania and Egypt stressed the coastal erosion problem. Fish stock diminishing is an important problem for Mauritania while TTPP highlights the unemployment. The low value given by most of the countries to eutrophication shows the insufficient awareness and the lack of knowledge about it compared with other problems such as sewage discharges, fish stock diminishing or loss of coastal habitats. The lack of knowledge about the coastal system is only considered important in Mauritania, Egypt and Algeria. It is interesting the fact that the unclear institutional responsibilities definition is only considered to be a priority by Morocco (the second highest value in Morocco) and followed with certain distance by TTPP and Egypt, while the rest of countries do not consider it to be an important problem.

4.2. Analysis of the progress of ICZM

The information concerning the progress of ICZM in the different countries was collected through yes/no questions. The results obtained are presented in the following chapters.

To frame the results into the administrative reality of each country, Table 6 presents the main national agencies and ministries with responsibilities or competences on the coastal zone, the laws affecting the coastal area and the main ICZM initiatives for each country.

The collected answers concerning the progress on ICZM in the different countries are analyzed in this section. Two approaches are developed in order to understand the situation of the Mediterranean region in the implementation of ICZM: first, a global vision of the total percentages obtained for each answer (yes/no/no answer) is presented for the region as well as for each country, including comparisons between countries; secondly, a detailed analysis of the

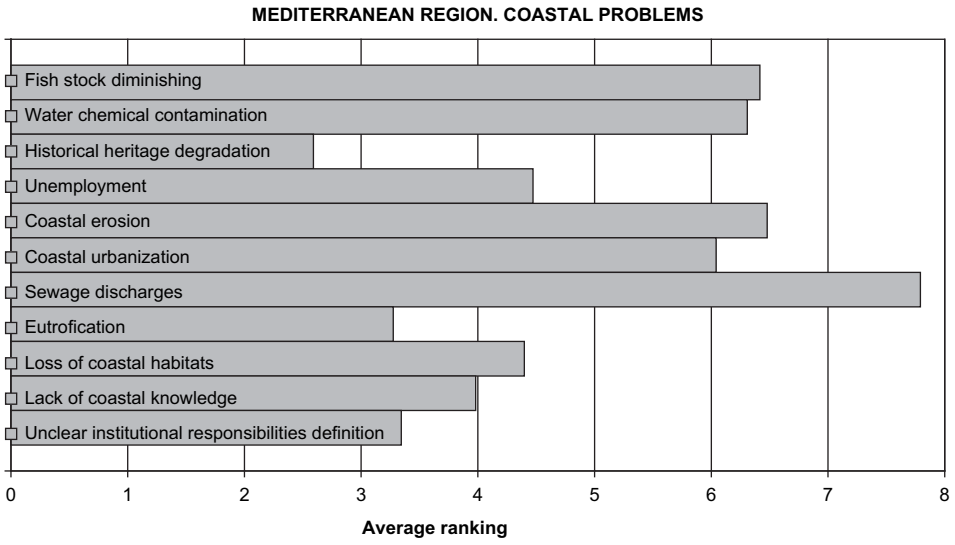

Chart 4. Coastal problems in the Mediterranean region.

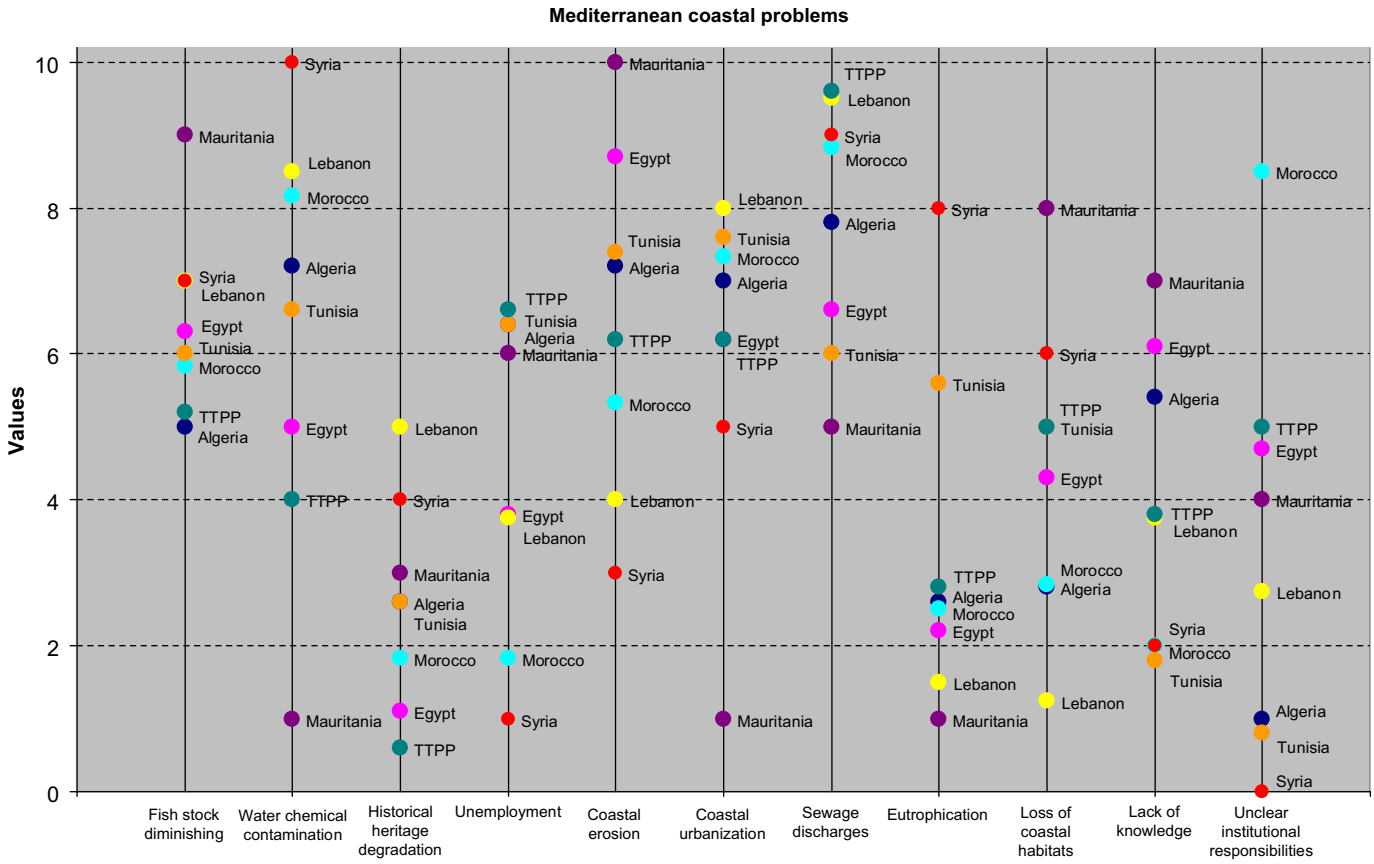

Chart 5. Mediterranean coastal problems per countries.

answers of each country has been carried out in order to determine the real level of implementation of ICZM.

Furthermore, an analysis of the ICZM Progress Indicator is conducted according to the results obtained from this work.

To begin the analysis, it is necessary to remember the five groups of questions that represent the different phases of an ICZM implementation, proposed by Pickaver et al. and used in this paper to assess the progress of ICZM in the Mediterranean countries:

- Phase I: non-integrated coastal management is taking place (questions a–e).
- Phase II: a framework for ICZM exists (questions f–k).
- Phase III: vertical and horizontal integration exists (questions l–u).
- Phase IV: an efficient, participatory, integrative planning exists (questions v–x).
- Phase V: there is a full implementation of ICZM (questions y–z).

First of all, the total percentages obtained for each answer (yes/no/no answer) for the entire Mediterranean region are presented in Chart 6. Considering that the five groups of questions represent the different phases of the ICZM implementation, a reduction trend of positive answers as we reach the last ones can be observed. There are also some actions (i.e. "s", "x" and "y") which are easier to carry out than others, even though they belong to more advance phases of the process.

An analysis of the percentage of each answer (yes/no/no answer) for the different countries is presented in Chart 7. The data collected through the attendees show that the most advanced countries concerning the implementation of ICZM are Algeria, Syria and Tunisia as they have more than 60% of positive answers. The country with less ICZM implementation is Egypt with two "no answers", five positive and 19 negative answers. It is also interesting to note that Albania and Lebanon has an important number of "no answers", being even higher than positive or negative ones in the case of Albania. This is due to the contradictory answers made by the representatives of these countries, which lead to consider them as "no answer".

Furthermore, an analysis of the progress on ICZM in the different Mediterranean countries has been carried out. Chart 8 presents the evolution of ICZM for Algeria and Egypt to show the disparity between countries with different levels of implementation. The answers go from −1 (negative answer) to 1 (positive answer). From this chart we can extract that Algeria has a more developed and advanced integrated coastal management even though it still has problems to accomplish all the tasks, specifically in Phases III, IV and V. Egypt only achieves the first phase which means that non-integrated coastal management is taking place.

Considering at the same time the results obtained for each question and for each country, Table 7 shows the cross of the two variables, the specific answers of all the countries for each question as well as the total percentages of positive/negative answers obtained for each question. Its analysis is presented in the following lines.

Phase I questions reach 80–90% of positive answers, except in question (e) which receives only 27%, being therefore an important problem in this initial phase. The content of (e) question concerns the availability of funding.

Phase II questions reach the 50–75% of fulfillment except for questions (h) and (k) with 45% of positive answers each. These two questions are referred to the periodical reporting of the state of the coast and the existence of a strategy for sustainable development.

Table 6
Legal–administrative framework in the Azahar Mediterranean countries.

	Main national coastal agencies	Coastal legal instruments	Main ICZM initiatives
Albania	– Ministry of Environment, Forest and Water Administration	– Law 8093/1996 on water resources	– ICZM and clean-up project (WB)
	– Ministry of Planning	– Law on Environment Protection (2002–07)	– Albania coastal zone management plan (METAP-WB)
	– Ministry of Tourism, Culture, Youth and Sports	– Law on Urbanism (1998–2003)	– Karavasta lagoon PHARE project
	– Ministry of Public Works, Transport and Telecommunication	– Law on Tourism Development (2002)	– CAMP "the Albanian coastal region" (UNEP/MAP)
	– Regional Environmental Agencies	– Law on Protected Areas – Law on the Protection of Marine Environment from Pollution – Law on the Treatment of WasteWater – Law on the Port Authority (2003) – Convention on the Protection of Sea Environment and the Coastal Zone of the Mediterranean	
Algeria	– Ministry of Spatial Planning and the Environment	– Law on Tourism Sustainable Development (2002)	– Coastal Action Plan (MAP)
	– Ministry of Public Works	– Law on Littoral Evaluation and Protection (2002)	– CAMP "the Algerian coastal area" (UNEP/MAP)
	– Ministry of Fisheries	– Law on Coastal Management and Sustainable Development (2003)	– Development and management scheme for the coast (SDAL)
	– Ministry of Tourism		– Algerian coast management through integration and sustainability -AMIS- (SMAP III)
	– Ministry of Interior – National Commission for the Littoral (CNL) – National Committee against Marine Pollution – Port Authorities – Coast Guard		
Bosnia-Herzegovina	– Ministry for Physical Planning	– No coastal-specific legal instrument	– Pre-investment study for wastewater and solid waste management project in Neum Bay region (GEF)
	– No national agencies/ministries with coastal responsibilities. Regional (federal), cantonal and local (municipal) level	– Law on Water (2006), in accordance to WFD	– Implementation of economic instruments for a sustainable operation of wastewater utilities (GEF)
Egypt	– Ministry of Environment: EEAA	– Law 12/1984 on irrigation	– Fuka-Matruh CAMP (UNEP/MAP)
	– Ministry of Irrigation and Water Resources	– Law 4/1994 on Environmental protection	– ICZM project (DANIDA)
	– Shore Protection Authority	– Law 102/83 on Natural Protectorates	– Matruh-Sallum ICZM project (AECI)
	– Coastal Research Institute	– Law 48/82 on Control of uses of River Nile	– Sustainable management of scarce resources in the coastal zone -SMART- (EC)
	– Fisheries Development Authority	– MAP series of Conventions (international)	– Alexandria Lake Mariout Integrated Management -ALAMIM- (SMAP III)
	– Ministry of Agriculture and Land Reclamation: Fish Resource Agency	– Global and regional treaties, conventions and agreements related to marine and environment	– Plan of action for an ICZM in the area of Port Said (SMAP III)
	– Ministry of Tourism: TDA – Ministry of Maritime Transport – Ministry of Housing – Ministry of Petroleum – Ministry of Health – Ministry of Defense – Local Governorates		
Jordan	– Ministry of Environment	– Ministry of Env. Article 8, 9A, 10. No 1 (2003)	– Gulf of Aqaba Environmental Action Plan (GEF)
	– Aqaba Special Economic Zone (ASEZ)	– ASEZ article 52 No 32 (2000)	– Sustainable management of scarce resources in the coastal zone -SMART- (EC)
	– Ministry of Transport	– Environmental protection regulation No 22 (2001)	
	– Ministry of Water	– Ministry of water and irrigation 893 (1994)	
	– Ministry of Health	– Water Authority of Jordan (WAJ) No 202 (1982 updated 1991)	
	– Ministry of Tourism	– Shipping law No 51 (1961).	
	– Public security (police)	– Ministry of agriculture No 20 (1973). NGOs.	
Lebanon	– Ministry for Public Works and Transport	– Decision No. 144/R (1924)	– CAMP Lebanon (UNEP/MAP)
	– Ministry of Environment	– Degree No. 4810 (1966)	– Sustainable management of scarce resources in the coastal zone -SMART- (EC)
	– Council of Development and Constructions	– Law 4810/1966 on regulation of the property near the coastal zone	– ICZM between Jbeil/Amsheet and Latakia (SMAP III)

(*continued on next page*)

Table 6 (*continued*)

	Main national coastal agencies	Coastal legal instruments	Main ICZM initiatives
		– Degree No. 2522 (1992)	– Integrated management of East Mediterranean coastlines -IMAC- (SMAP III)
Mauritania	– Ministry of Fisheries and Maritime Economy – Ministry of Environment – Ministry of Land Management – Ministry of Transport – Ministry of Interior – Ministry of Finances – National Marine	– Merchant Marine Code. Law 78-043. – Fisheries Code. – Law on Parc du Banc d'argain (PNBA)	– Mauritanian coastal management master plan
Morocco	– Ministry of Spatial Planning – Ministry of Transport – Ministry of Interior – Ministry of Environment, Energy, Mines and Water – Ministry of Maritime Fishing – Ministry of Water and Forests – Ministry of Habitat and Urbanism – Ministry of Agriculture – Ministry of Land Management – Ministry of Habitat and Urbanism	– Law on Maritime Public Domain (1914) – Law on Environmental Protection (2003) – Law on Environmental Impact Assessment (2003) – Law on Forests (1917) – Law on Maritime Fisheries (1919, 1973) – Law on Continental Fisheries (1922) – Law on Urbanism (1992) – Law on Water (1995) – Law on Quarries (2001) – Law Cadre on Environment (2003) – Law on Air Quality (2003) – Law on Solid Waste (2006)	– Reducing conflicts of coastal natural resources in the Nador area of Morocco (SMAP III) – An ICZM approach for sensitive wetland areas: El Kala/Moulouya (SMAP III)
Palestinian Territories	– Ministry of Environment: coastal section – Environmental Quality Authority – Ministry for Public Works – Ministry for Planning – Ministry for Local Government	– Law on Environmental Protection (1999)	– Water community programme to promote community based awareness (SMAP III) – The Fara'a and Jerash Integrated Watershed Management Project (SMAP III) – Regional Solid Waste Management Project in METAP Mashreq and Maghreb Countries (SMAP III)
Tunisia	– Ministry of Environment and Sustainable Development – Ministry of Interior – Ministry of Agriculture – Ministry for Tourism – Ministry for Transport – Ministry for Industry – Ministry for Spatial Planning – Ministry of Public Works, Habitat and Land management (DESAM) – Agency for Littoral Protection and Management (APAL) – Agency for environmental Protection (ANPE)	– Law on Maritime Public Domain (1993) – Law on the creation of APAL (1995) – Law on Environmental Impact Assessment – National Commission on Sustainable Development	– Coastal Protection and Management Agency (APAL) – Planning and Management Masterplan (METAP) – CAMP Sfax (UNEP/MAP) – ICZM strategies for the 'Kroumirie and; Mogods' region and 'Grand Sfax' municipality (SMAP III) – Sustainable Management of Scarce Resources in the Coastal Zone -SMART- (EC)
Syria	– Ministry of Local Administration and Environment – Director of Water Safety. General Commission for Environmental Affairs. State Planning Commission	– Environmental Syria law No 50 (2002). Mediterranean Action Plan (MAP) (1975), Barcelona Convention against pollution, protocol for prevention of pollution from ship dumping, – Protocol for cooperation against pollution. Adopted in 1983. Strategic Action Programme (SAP) (1997)	– CAMP Syrian Coastal region (UNEP/MAP) – ICZM between Jbeil/Amsheet nd Latakia (SMAP III)

Phase III questions reach the 25–50% of achievement except for questions (m) and (q) with 9% and (n) with 18%. The first two questions concern the availability of human resources in the administration and the availability of technical and scientific information for the population; the third question concerns the flow of ICZM information between administrations.

Phase IV questions had the following percentages: (v) and (w) received the 18% of positive answers while (x), 45%. These results are not very coherent, as the first two concern the long-term financial commitment for ICZM and the continuous assessment of the progress towards coastal sustainability while the third one is the existence of a real positive trend towards sustainability. The statement of a positive trend towards sustainability is striking if we take into consideration that a proper and continuous assessment are not being undertaken; this incoherence mainly affects the answers of Lebanon and Mauritania.

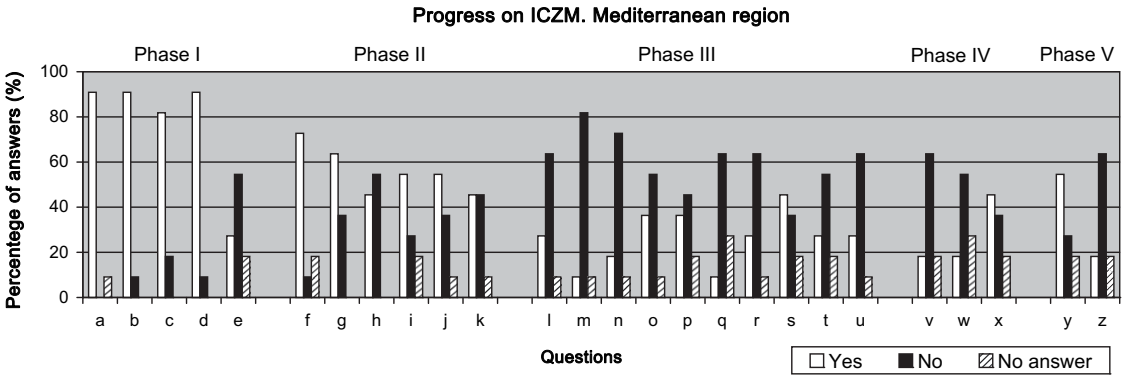

Chart 6. ICZM Progress Indicator. Percentage of answers for the Mediterranean region.

Phase V questions had 54% of positive answers for question (y) and 18% for question (z). The first one is about the implementation of the above actions and the second one concerns the automatic initiation of a re-evaluation process.

The main conclusions obtained from this analysis are the following:

None of the consulted countries have a fully implemented ICZM and the main problems faced in the implementation have been detected for each country.

There is a logical decreasing trend in the number of positive answers as we advance to the last questions. However, there are some actions that break this trend either because they are more easily implemented although they belong to more advanced phases (actions "o", "p", "s" or "y"), or because they present serious difficulties to be implemented into their phases (as action "e" in Phase I, "h" and "k" in Phase II, etc.).

Through the use of this indicator and the analysis of the actions presenting difficulties to be implemented into their phases, the main problems faced by the countries to apply the ICZM, have been detected. These problems are referred to in the following issues:

- The availability of *funding* for the implementation of ICZM at the beginning of the process as well as for the long-term (actions "e" and "v").
- The development of a periodically revised "state of the coast" report and a continuous *assessment* of progress towards sustainability goals (actions "h" and "w").
- The elaboration and implementation of a sustainable development *strategy* (action "k").
- The availability of sufficient *human resources* working on ICZM in the administrations (action "m").
- The existence of an adequate flow of *information* on ICZM issues between administrations and the availability of scientific and technical information for the population (actions "n" and "q").
- The *automatic initiation* of a re-evaluation of ICZM progress (action "z").

Considering the total number of positive answers given by each country, Fig. 4 shows how advanced these countries are in the implementation of ICZM. The categories are classified by numbers from 1 (low level of implementation) to 4 (high level of implementation), even though none of the countries achieves level 4. The level of implementation is not affected by geographic location, socio-cultural issues or the size of the country. However, focusing on the most advanced countries in ICZM implementation two important conclusions are obtained: on the one hand, Syria and Jordan have small coastline length (183 and 27 km, respectively) which could be associated to an easier coastal management; on the other hand, Algeria and Tunisia, both of them with a long coastline

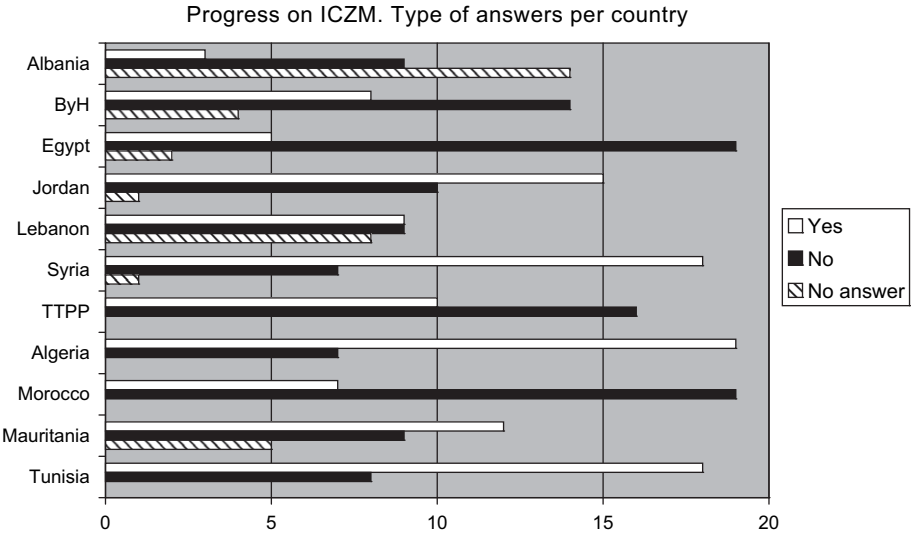

Chart 7. ICZM Progress Indicator. Type of answers for each Mediterranean country.

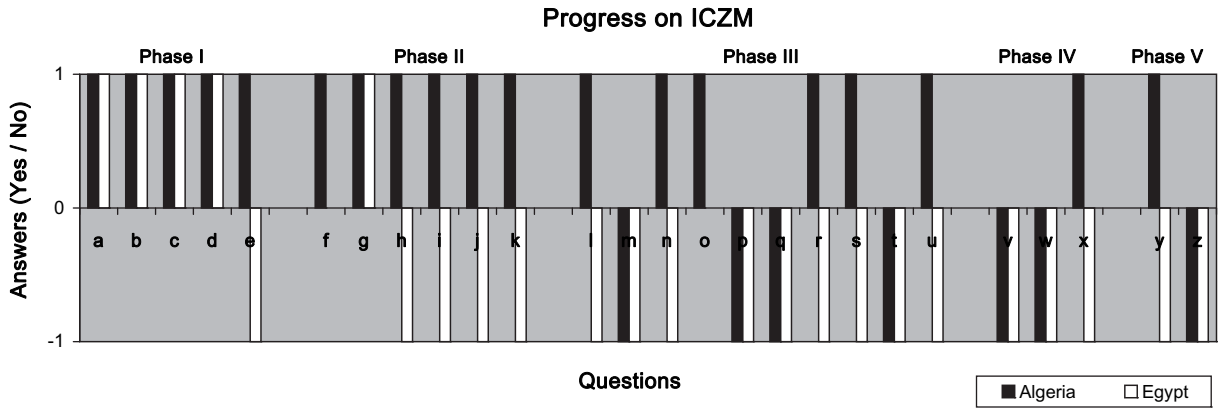

Chart 8. ICZM Progress Indicator. Type of answers for Algeria and Egypt.

length (among 1200–1300 km), are the only ones having a coastal legal framework and national coastal agencies with responsibilities or competences on the coastal zone.

Focusing now on the most advanced countries in ICZM, Algeria and Tunisia differ from the others in the fulfilment of actions related to public participation (actions "l" and "r"), administrative coordination (action "o"), cooperation (action "s") and monitoring (action "x"). These advances have enabled these countries to develop and implement plans, programmes and projects that definitely encourage progress towards coastal sustainability. In addition to this, both countries stated that "Monitoring on the coastal zone sees a positive trend towards greater sustainability of coastal resources, an improvement in the state of the coast and in coastal habitats and biodiversity".

This is evidenced, for example, in the Reghaia Lake in Algeria, a very important zone in terms of ecological richness (Ramsar convention) and subjected to significant pressures due to different uses in a complex system (urban, industrial, agriculture, tourism, etc.). Big progress is being made towards sustainability thanks to the Reghaia Lake Management Plan, which has a strong component of public participation and sectoral involvement. In Tunisia, the legal and administrative advancement in coastal management is promoting the establishment of a National Programme for the creation of marine and coastal protected areas, the National Programme for wetlands rehabilitation, Beach Occupation Plans or specific projects for sanitation, rehabilitation, zoning and management of coastal zones (Plage d'Aguir, Djerba) and wetlands (sebkha de l'Ariana), all of them with a strong component of environmental education and awareness. These examples show a correlation between high values in ICZM implementation level, presented in this paper, with the progress towards sustainable development in the Mediterranean region.

5. Comparison with the European results

The Indicators and Data Working Group (WG-ID) of the European ICZM Expert Group tested the ICZM Progress Indicator. Over 100 practitioners in Europe (particularly in Spain, Germany, Poland, Malta, England, Wales, Belgium, Holland and France), completed the Progress Indicator questionnaire during 1 day workshops carried out in the different countries. The COREPOINT

Table 7
Results of the application of ICZM Progress Indicator for the Mediterranean developing countries.

ICZM phase	Question	Albania	B-H	Egypt	Jordan	Lebanon	Syria	TTPP	Algeria	Morocco	Mauritania	Tunisia	ICZM phase	Question	% SI	% NO	% No answer
Phase I	a	?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Phase I	a	90.91	0.00	9.09
	b	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES		b	90.91	9.09	0.00
	c	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES		c	81.82	18.18	0.00
	d	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES		d	90.91	9.09	0.00
	e	?	YES	NO	NO	?	NO	NO	YES	YES	NO	NO		e	27.27	54.55	18.18
Phase II	f	?	YES	?	YES	NO	YES	YES	YES	YES	YES	YES	Phase II	f	72.73	9.09	18.18
	g	NO	YES	YES	YES	NO	YES	NO	YES	YES	NO	YES		g	63.64	36.36	0.00
	h	NO	NO	NO	YES	NO	YES	NO	YES	YES	NO	YES		h	45.45	54.55	0.00
	i	?	NO	NO	YES	?	YES	YES	YES	NO	YES	YES		i	54.55	27.27	18.18
	j	?	NO	NO	YES	YES	YES	YES	YES	NO	NO	YES		j	54.55	36.36	9.09
	k	NO	?	NO	YES	NO	YES	YES	YES	NO	NO	YES		k	45.45	45.45	9.09
Phase III	l	NO	NO	NO	NO	?	YES	NO	YES	NO	NO	YES	Phase III	l	27.27	63.64	9.09
	m	NO	NO	NO	NO	?	NO	NO	NO	NO	YES	NO		m	9.09	81.82	9.09
	n	NO	NO	NO	NO	?	YES	NO	YES	NO	NO	NO		n	18.18	72.73	9.09
	o	NO	YES	?	NO	NO	YES	NO	YES	NO	NO	YES		o	36.36	54.55	9.09
	p	?	YES	NO	YES	YES	YES	NO	NO	NO	?	NO		p	36.36	45.45	18.18
	q	?	YES	NO	NO	?	NO	NO	NO	NO	?	NO		q	9.09	63.64	27.27
	r	NO	?	NO	NO	NO	NO	NO	YES	NO	YES	YES		r	27.27	63.64	9.09
	s	?	NO	NO	NO	?	YES	YES	YES	NO	YES	YES		s	45.45	36.36	18.18
	t	?	?	NO	NO	NO	YES	NO	NO	NO	YES	YES		t	27.27	54.55	18.18
	u	NO	NO	NO	?	NO	NO	YES	YES	NO	YES	NO		u	27.27	63.64	9.09
Phase IV	v	?	NO	NO	YES	NO	?	NO	NO	NO	NO	YES	Phase IV	v	18.18	63.64	18.18
	w	?	NO	NO	YES	?	YES	NO	NO	NO	?	NO		w	18.18	54.55	27.27
	x	?	?	NO	YES	YES	NO	NO	YES	NO	YES	YES		x	45.45	36.36	18.18
Phase V	y	?	YES	NO	YES	YES	YES	NO	YES	NO	?	YES	Phase V	y	54.55	27.27	18.18
	z	?	NO	NO	YES	YES	NO	NO	NO	NO	?	NO		z	18.18	63.64	18.18

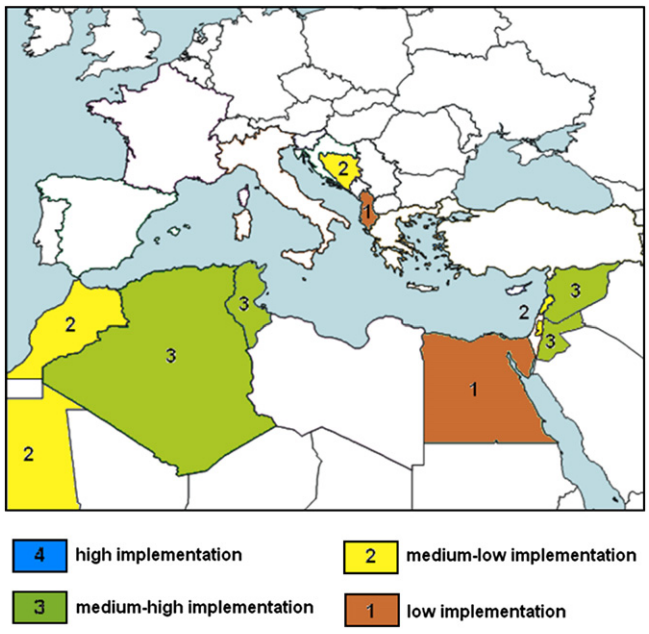

Fig. 4. Current levels of ICZM implementation in the Mediterranean: from "low implementation" (number 1) to "high implementation" (number 4).

Project also provided a platform to test the indicator in the UK, France, Belgium and Ireland [16–19].

The complete results of these tests are not yet available; however some information can be extracted from official reports. According to the Report on the use of the ICZM indicators from the WG-ID (2006) [17], the difficulties faced by the tested European countries (Belgium, England, Malta and Poland) are very similar to those identified for the Azahar countries. The first phases show a good advancement, while focus should be oriented towards progress in the latter phases. Taking into account both the results and the suggestions made by the participants, this report states that the next actions for Europe should concentrate on five main objectives: the *integration of the administration* bodies, the integration of *information* for the decision making, the constitution of a good system of *participation and governance* and a good system of *financing* ICZM planning and management, and finally, a *follow up* of the progress done on the sustainability of the coast.

These objectives evidence that all the coastal countries, both in Europe (Northern and Mediterranean) and in the Azahar countries, need to overcome the same difficulties and face the same challenges to fully implement ICZM.

6. Conclusions

The assessment of the progress on ICZM in a country does not give a precise idea about the achievement of coastal sustainable development, being therefore necessary to determine the improvement of the state of the coast through another set of indicators. Both assessments together, conducted regularly, will help to understand the coastal trends and to make a more adequate conclusion about the ICZM implementation and its relation with the improvement in the state of the coast. Most of the existing models to assess the achievement of coastal sustainable development propose the analysis, usually carried out through the pressure-state-response (PSR) framework, of the different coastal subsystems separately through environmental, socioeconomic and governance indicators. To assess the implementation of ICZM, the methodologies proposed by different authors are structured into several sets of indicators measuring goals and outcomes, or different order of outcomes. This joint analysis, state of the coast and state of the ICZM, results in a set of hundreds of indicators and measures. The collection of this high amount of specific information may not be accessible for everyone but only for institutions directly involved in ICZM, especially working with developing countries. The kind of information that can be obtained through questionnaires to people from different backgrounds and professional profiles together with the objective of combining the results of several countries, require indicators based on simple and representative questions as well as simple answers.

The work presented in this paper, in the first place, proposes a sustainable development indicator to easily analyze the state of the coast through a subjective assessment of the relationship between economic sectors, pressure on the coastal environment and social awareness. Furthermore, the ICZM Progress Indicator proposed by Pickaver et al. is used to assess the level of implementation of ICZM. These two tools, combined with questionnaires to gather the required information, have allowed us to obtain and assess the valuable data from the Mediterranean developing countries provided in this paper. It is important that this joint assessment proposed represents the perceived diagnosis of the stakeholders and a way to involve them in the process of coastal management.

The main conclusion from the implementation of the ICZM Progress Indicator to the Mediterranean developing countries is that none of the consulted countries have a fully implemented ICZM. The major problems faced by the consulted countries are: (i) the lack of financial commitment for the implementation of ICZM; (ii) the lack of an assessment and monitoring system; (iii) the lack of knowledge about the coastal system; (iv) the lack of qualified human resources; and (v) the lack of public participation and administrative integration strategies, based on information. The analysis carried out in Europe evidences that all the coastal countries, both in Europe and in the Azahar countries, need to overcome the same difficulties and face the same challenges to fully implement ICZM.

The main recommendations obtained from the analysis of the issues mentioned above are the following: (i) it is necessary to develop a national strategy on ICZM, a long-term plan on sustainable development of the coastal zone; (ii) the cases of Algeria and Tunisia demonstrate that the development of a coastal legal framework as well as specific agencies or institutes to deal with coast related issues is a necessary step to better implement the ICZM; (iii) the creation of economic instruments intended to support local, regional and national initiatives for ICZM are needed; (iv) strategies for coastal resources management as well as for monitoring are required; (v) a capacity building initiative would be helpful to cover the lack of human resources with expertise on ICZM; and finally (vi) a coordination and administrative integration strategy is needed to overcome the lack of information and coordination between the institutions with competences on the coastal zone.

This work provides current data and information about the state of the ICZM and the state of the coast in the Mediterranean countries. It is the starting point to assess the evolution and the reference point from which ICZM will be improved through the Protocol on ICZM for the Mediterranean.

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