

SYSTEM OF INDICATORS

for Integrated Coastal Zone Management in the Balearic Islands



Official Opinion 5/2007 of the Economic and Social Council of the Balearic Islands



Presentation letter

This publication is the result of a collaboration among three public institutions that, through their objectives, carry out different functions in our society: the Director General of Research, Technological Development and Innovation (R+D+i), an organ of the Government of the Balearic Islands responsible for implementing R+D+i policies; the Mediterranean Institute of Advanced Studies, a joint research centre of the Spanish National Research Council and the University of the Balearic Islands (IMEDEA (CSIC-UIB)), an exemplary centre of marine and coastal environmental research at national, regional and international levels; and the Economic and Social Council of the Balearic Islands (CES), a statutory organ that represents organized civil society and expresses, through Official Opinions (Dictamen), the needs of our society with respect to social, economic and employment issues.

The joining of these three institutions for this work was an activity that forms part of the interdisciplinary research project for Integrated Coastal Zone Management (ICZM), led by the IMEDEA (CSIC-UIB) with the support of the Directorate General of R+D+i of the Government of the Balearic Islands. The collaboration of these three institutions has focused on the definition of a proposal for a system of indicators for ICZM in the Balearic Islands, drawing upon the latest research on ICZM and indicators at the international level.

The research was carried out with a focus on the principle of sustainability, which includes environmental, socio-economic and governance dimensions. It is in the latter two dimensions where the support of the CES, through the economic and societal groups they represent, has been very useful for defining methodology and indicators for the proposal. The fact that the CES has agreed to provide this support in the form of an Official Opinion has provided added value, given that this does not represent individual, subjective opinions, rather, it is the joint opinion of an institution that has made public its consensus on the important and sensitive issue of how the Balearic Islands can improve their environment with respect to sustainability principles.

We believe that the process involved in developing the indicator proposal is an example of best practices with respect to two key elements of the governance process: firstly, the broad, fruitful collaboration among public institutions which, in principle, may not be considered compatible to do so given their varied social objectives. Second, the consensus that was achieved, which demonstrates that consensus can not be tangible or concrete in the absence of the political will of economic and social agents, or without the perseverance necessary for working towards the improvement of collective well-being.



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Antecedents

The System of Indicators for Integrated Coastal Zone Management in the Balearic Islands forms part of the activities of the Integrated Coastal Zone Management Unit (ICZM Unit) of the Mediterranean Institute of Advanced Studies, IMEDEA (CSIC-UIB), formed in 2005 in collaboration with the Director General of R+D+i of the Government of the Balearic Islands. This research unit represents a joint research initiative, the I+D+i GIZC Project, that is ambitious and realistic, based on the recognition of the need for quality scientific research as a key element for achieving sustainability in the coastal zone of the Balearic Islands. The objective of the I+D+i GIZC Project is to conduct scientific research and technological development, favouring transfer of knowledge and innovation, in order to achieve ICZM in the Balearic Islands based on scientific understanding.

The collaboration with the Economic and Social Council of the Balearic Islands (CES) for the current initiative began at the end of the first mandate of the president Frances Obrador, and has continued throughout the second mandate of the president Llorenç Huguet and has had, at all times, the support of both presidents.

The work process has been long, and has been done step by step with an emphasis on involving all of the committees of the CES that represent diverse opinions and societal needs, with the final objective of reaching a consensus that at first was difficult to define. In order to give justice to the complexity of the process, it is important to briefly reflect on the duration and difficulty that this process of discussion has created within the CES.

The first contact of the CES with the project was initiated in May 2006 with an invitation from the IMEDEA (CSIC-UIB) to the president of the CES to visit the centre, where he was explained the objectives of the I+D+i GIZC Project. As a result of this visit, the president of the CES invited the director of the IMEDEA (CSIC-UIB) to present the I+D+i GIZC Project to the Permanent Commission of the CES on July 12th 2006. In this session, it was agreed that the Working Commission of Economy, Regional Development and Environment of the CES would nominate a technical commission to develop, in collaboration with the IMEDEA (CSIC-UIB), a proposal for collaboration within the I+D+i GIZC Project.

The report of the president Frances Obrador that was presented to the Permanent Commission of the CES at the end of his mandate on August 30th 2006 recognized the importance of the aforementioned agreement of July 12th. On September 27th 2006, the Plenary of the CES was informed for the first time about the initiative with the presentation of a proposal for collaboration with the IMEDEA (CSIC-UIB) related to indicators for ICZM.

The Working Commission of Economy, Regional Development and Environment of the CES agreed on October 20th 2006 that the president of the Commission, Vicenç Tur; the technical economist of the CES, Ferran Navinés; Joaquín Tintoré, director of the IMEDEA (CSIC-UIB); and a research scientist of this institute, Amy Diedrich, would meet in order to discuss possible areas of collaboration within the I+D+i GIZC Project.

On December 1st 2006, the Working Commission of Economy, Regional Development and Environment of the CES was informed, as a result of these meetings, of the IMEDEA's (CSIC-UIB) interest in collaborating with the CES so that they may support the consensus of the economic and social agents with respect to the development of the list of indicators for ICZM that IMEDEA (CSIC-UIB) was elaborating. The CES considered this proposal to be of interest due to the fact that, once there indicators were defined, they could be used to expand and improve the sustainability indicators in the Annual Report of the CES, particularly those that relate to tourism and the environment, considering that, in addition, these indicators would be broken down to the island and municipal levels.



Once the second mandate of the CES was initiated with its new president, Llorenç Huguet, the initiative of collaboration with IMEDEA (CSIC-UIB) in the ICZM project gained additional momentum. In this context, on February 21st 2007 the Permanent Commission of the CES and on March 27th 2007 the Plenary agreed that the Permanent Commission would exercise the general control over the collaboration to develop a list of indicators for monitoring and evaluating ICZM in the Balearic Islands. At the same time, it was agreed that the Permanent Commission would assign each of the working commissions of the CES with the task of making proposals for the indicator system related to their areas of interest (economy, labour, social issues).

In accordance with these agreements of the Permanent Commission, the working commissions of the CES met with IMEDEA (CSIC-UIB) researchers Amy Diedrich and Guillermo Vizoso in order to discuss the proposal for socio-economic indicators. The Working Commission of Economy, Regional Development and Environment met on April 18th 2007, and the Commissions of Employment and Labour Relations, and Social Affairs met on May 9th 2007.

The Permanent Commission was informed of the results of the discussions of the working commissions of the CES related to the indicator proposals of the CES in a session on May 23rd 2007, where the director and researchers of the IMEDEA (CSIC-UIB) were also invited. At this time, it was also agreed that, prior to being submitted to the Plenary, the proposal would be evaluated by an ad hoc technical group, formed by the presidents of the four working commissions of the CES who, at this time, were Vicenç Tur, Lluís Vallcaneres, Eva Cerdeiriña and Josep Ignasi Aguiló, the secretary general, Pere Aguiló and the economic analyst, Ferran Navinés. Finally, it was also agreed that the final document that would be submitted to the Plenary would also include a recommendation for the necessity to carry out a prioritization of the indicators and an evaluation of their viability (availability of data, methodology, and evaluation of implementation cost).

This ad hoc group met on June 8th 2007 and submitted their proposal to the Permanent Commission on June 20th, who agreed to pass it on to the Plenary which finally approved it on June 27th. It was also agreed that the work on the indicator proposal would be continued in the IMEDEA (CSIC-UIB) so that it could be in line with the research activity related to the I+D+i GIZC Project. The Plenary agreed to also include in the proposal a recommendation that the IMEDEA (CSIC-UIB) carry out a prioritization of the indicators based on their viability and overall importance for achieving sustainability objectives.

The Permanent Commission was informed in a meeting of September 19th 2007 of the formal request of the IMEDEA (CSIC-UIB) for the continuation of the project, with a view to prioritizing the indicators based on their viability and importance and agreed to initiate a second phase of collaboration. With this objective, an ad hoc commission was formed, with members of the three ordinary working commissions of the CES, to carry out the necessary technical work, and to generate a proposal to be submitted to the Permanent Commission and then to the Plenary for their final approval and ultimate decision as to whether the resulting document should be presented as an Official Opinion or as a Final Report.

The Plenary was informed on September 26th 2007 of the initiation of the second phase of collaboration with the IMEDEA (CSIC-UIB) and the proposal to convene a joint session with the three ordinary working commissions of the CES in order to conduct a Delphi study to assist the researchers at IMEDEA (CSIC-UIB) to further elaborate the indicator proposal so that it reflects the viability and social importance of the indicators.

The joint session of the three working commission of the CES took place on November 7th 2007 where they responded to the Delphi questionnaire prepared by the researchers and technicians of CES and the IMEDEA (CSIC-UIB). This allowed for a proposal of prioritization of the indicators that was submitted to the Permanent Commission on November 14th of 2007. In this session, the Commission initially approved the indicator proposal, and decided that it should be adopted as an Official Opinion. This opinion was presented to the Plenary where it received their final approval.

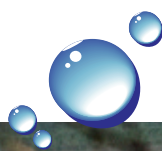
On December 11th 2007, the Permanent Commission ultimately approved the Proposal for the Official Opinion for the System of Indicators for ICZM in the Balearic Islands, which was ratified by the Plenary and therefore definitively approved by consensus in the session of December 17th 2007.

Index

Antecedents	3
Summary	4
Introduction	8
Tables of Indicators	15
Table A. Governance Indicators	16
Table B. Socio-economic Indicators	21
Table C. Environmental Indicators	36
Viability and Importance Rankings	38
Viability ranking:	39
Importance Ranking:	41
Specific recommendations for the implementation of the System of Indicators for ICZM in the Balearic Islands	43
Bibliography	44
Annex 1. Governance Indicators	44
Annex 2. Socio-Economic Indicators	44
Annex 3. Environmental Indicators	44
Annex 4. Indicators Eliminated in Phase II	44
Annex 5. Methodology to calculate the viability of indicators	44
Annex 6. Results of the Delphi Study	44



**Official Opinion 5/2007
concerning the System of Indicators
for Integrated Coastal Zone
Management (ICZM) for the
Balearic Islands**



Official Opinion 5/2007 concerning the System of Indicators for Integrated Coastal Zone Management (ICZM) for the Balearic Islands

Taking into consideration Article 2 (1b) of Law 10/2000 of November 30th of the Economic and Social Council of the Balearic Islands, and Article 4 (a), second clause, of Decree 128/2001 of November 9th, where the Regulation for Organization and Function is approved, the Economic and Social Council emits the following

OFFICIAL OPINION

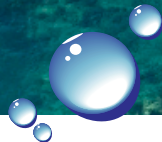
1. Antecedents

First. During the final phase of the first mandate of the Economic and Social Council (CES) the possibility of a collaboration between the CES and the Mediterranean Institute of Advanced Studies (IMEDEA) is explored for the purpose of elaborating a system of indicators in the framework of IMEDEA's research related to Integrated Coastal Zone Management (ICZM) in the Balearic Islands, with the objective of developing a tool that will allow for advancement towards sustainability in the coastal zone, based on solid science and understanding, following international standards and capturing the needs of the society of the Balearic Islands.

Second. Having initiated the second mandate, the articulation of the collaboration CES-IMEDEA is debated in the session of the Permanent Commission of February 21st and, ultimately, in the Plenary Session of March 27th of 2007, defined through the agreement to initiate the first phase of the work. This phase begins with the definition of objectives for achieving ICZM. In this context, the objectives are classified in three categories: governance, socio-economy and environment. These three categories represent the three pillars of sustainability that interact in the coastal zone. To respond to the defined objectives, consensus is reached on a list of indicators, based on an extensive evaluation of international antecedents and standards and classified into three groups: governance indicators (Table A), socio-economic indicators (Table B), and environmental indicators (Table C). In this context, the Permanent Commission of the CES agrees, on April 25th, to designate the Working Commissions of the CES the role of analysing the list and generating proposals related to the material that pertains to their area of expertise. In accordance with this assignment, the Commissions assess the following indicators:

Working Commission of Employment and Labour Relations:

Indicator 13, (patterns of sectoral employment), 14 (qualification of human capital), 15 (unemployment), 16 (public service of employment) from table B.



Working Commission of Social Affairs:

Governance indicators (1 – 8 of table A) and indicators 49 (Corporate Social Responsibility) and 50 (social effects of seasonality) from table B.

Working Commission of Economy, Regional Development and Environment:

Remaining indicators in table B.

Third. In accordance with the definition of indicators, the proposals of the Working Commissions are approved in the sessions of the following weeks which are attended by the technicians from IMEDEA Guillermo Vizoso and Amy Diedrich. The process is completed on May 9th of 2007. The Commissions do not comment on environmental indicators (Table C).

Fourth. On May 23rd of 2007, the Permanent Commission initially approves the indicator proposal which has been examined by the Working Commissions, asserting that, prior to being evaluated by the Plenary, it should be evaluated by an ad hoc technical group, comprised of the presidents of the Working Commissions, the secretary general and the economic assessor. It is also agreed that, in the proposal that is presented to the Plenary, there should be a recommendation that highlights the necessity to conduct a prioritization of the indicators, an evaluation of availability of data, and an evaluation of implementation cost.

Fifth. The technical group meets on June 8th 2007 following the mandate of the Permanent Commission and conducts the revision of the indicators proposal, which is then ratified by the Permanent Commission on June 20th 2007, which passes on the definitive document to the Plenary for evaluation.

Sixth. In the Plenary session of June 27th 2007, the proposal for the indicators of the ICZM project is ratified, as approved by the Permanent Commission and the ad hoc technical group formed by the presidents of the Working Commissions. At the same time, it is agreed that this indicators proposal should be given back to IMEDEA so that they may continue with the research, with a clear recommendation for the necessity to conduct the prioritization of the indicators as well as the evaluation of cost and availability of data.

The final result of the process is a proposal for 56 indicators, each on related to a specific objective associated with one of the three categories. The indicators presented in Phase I constitute an exhaustive and consensual list, elaborated from the analysis of international initiatives and experiences, IMEDEA's own study and contributions from representatives of the CES. In Phase I, there were some important aspects that were not approached, such as the availability of data, measurement methodology, and cost.

Seventh. In accordance with the mandate of the Plenary on June 27th, the Permanent Commission agrees, on September 19th 2007, to initiate a second phase of the ICZM project. This second phase is intended so that the initial proposal materializes into concrete actions that allow for progress toward sustainability in the coastal zone of the Balearic Islands. In order to continue with the corresponding technical work, the Permanent Commission designates an ad hoc commission, formed by members of the three Working Commissions. It is also agreed that the resulting document will be examined by the Permanent Commission of the CES, who will submit it to the Plenary along with a proposal for the format that this document should adopt (Official Opinion or Informative Report of the CES).

Following the recommendations of the CES; the activities carried out in this phase include the prioritization of the indicators based on a viability analysis and an estimation of cost (time, personnel and technology) of implementing each indicator in addition to a series of recommendations for the generation, maintenance and distribution of the information from the indicators and, specifically, the identification of the groups, institutions or organs potentially responsible for each of them:

A) In relation to the prioritization of the indicators:

The viability analysis is based on seven parameters, ranked on a scale of one to three (1 = low viability, 3 = high viability). The parameters include: 1) availability of data, 2) availability of data at specified spatial scales, 3) availability of data at specified temporal scales, 4) state of development of methodology for calculating indicator, 5) complexity of management of indicator, 6) highlights tendencies over time, and 7) provides a response to a specific objective related to sustainability or ICZM.

In relation to the estimation of cost (principally personnel time and technology) for the development, implementation and measurement of the indicators, it must be considered whether the necessary variables have already been measured and, if so, whether they require a change in format or scale or if a new methodology must be developed.

Independently of the viability analysis and estimation of costs, the indicators were also ranked on the basis of their perceived overall importance (high, medium, low) for monitoring sustainability and ICZM-related objectives because, although importance is related to viability, they differ in that importance does not take into account the extra resources necessary to implement the indicator. A first ranking of importance is carried out by IMEDEA and, following this, on November 7th of 2007, the ad hoc commission formed by members of the three Working Commissions conducts a working session, mediated by an economic assessor of the CES and the technical team of IMEDEA, to ensure that the ranking of IMEDEA is in line with the priorities of the Balearic society. In order to do this, a Delphi study is carried out during the working session, where the respondents express their personal opinion with regards to the level of importance of each indicator using a scale of 1 (very low) to 5 (very high). Average scores are compared with IMEDEA's own scores, and if they are different (which only occurs in eleven cases) they are debated and adjusted to reflect the opinion of the CES. Thus the final level of importance represents the importance of the indicator from a social and scientific perspective.

The ranking of indicators based on the assessment of viability (e.g. high, medium and low) and the level of importance (e.g. high, medium and low) is presented in the form of two tables. These tables represent two complementary perspectives that can help with decisions regarding which indicators should be implemented in the absence of resources to implement the entire system: where resources (human, technical, etc.) are limiting factors, the viability ranking would be a more important reference since indicators with high viability require minimal or no resources to implement. If resources are available, the table of importance would be a better reference since it represents a more complete system of indicators with respect to measuring sustainability objectives in the coastal zone.

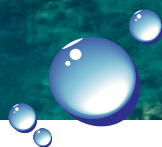
B) In relation to the recommendations for the implementation of the indicators, a series of suggestions are specified in the Observations section of this Official Opinion.

Eighth. In the session of November 14th 2007, the Permanent Commission initially approves the proposal elaborated by the ad hoc commission and passes it on the Plenary as a proposal for an Official Opinion who, in turn, approves the proposal in the session of December 17th of 2007. The Plenary agrees, finally, to attach the System of Indicators for ICZM in the Balearic Islands as an annex to the Official Opinion.

II. Observations

In line with the considerations above and in accordance with the technical works mentioned in the antecedents, this CES recommends the following:

First. Implement the System of Indicators for ICZM in the Balearic Islands, understanding that this is an open system that requires continual updates in accordance with international standards and European laws.



Second. Undertake the actions and ensure the availability of resources necessary to implement the system of indicators, giving priority to the most important and viable indicators.

Third. Take the necessary actions to identify and incorporate works directly related to obtaining and implementing indicators (past, present and future) to ensure maximum efficiency in the implementation of the system.

Fourth. Adapt or create the necessary normative to regulate and support the implementation of the indicators. In this context, we recommend the Balearic Institute for Statistics (IBESTAT) as the appropriate body to ensure efficient coordination of the system.

Fifth. Create a coastal environmental observatory where indicators may be accessed and analyzed (Balearic ICZM Observatory).

III. Conclusions

The diverse opinions, recommendations and conclusions of this Council for the System of Indicators for Integrated Coastal Zone Management (ICZM) in the Balearic Islands are presented in this Official Opinion and the adjoined annex.

Approved by:

The Secretary General
(designated by the Permanent Commission)

Núria Garcia Canals

The President

Llorenç Huguet Rotger

Palma, December 17th of 2007

Participating Commissions

The Official Opinion 5/2007 related to the system of indicators for Integrated Coastal Zone Management in the Balearic Islands was approved by the Plenary of the CES on December 17th 2007, following a proposal from the ad hoc working group formed by the members of the ordinary Working Commissions of the CES. The following tables list the members of Plenary and Working Commissions who contributed to the creation of this Official Opinion.

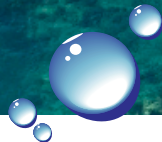
COMPOSITION OF THE PLENARY: PERMANENT AND SUPPLEMENTARY MEMBERS

Group I: Business Associations

PERMANENT MEMBERS	SUPPLEMENTARY MEMBERS	ORGANIZATION OR INSTITUTION
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Vicenç Tur Tur	Salvador Servera Jaume	CAEB
Miquel Vidal Fullana	Ana Reguera Rodríguez	CAEB
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Antonio Vilella Paredes	Miguel Perelló Quart	CAEB
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Pau Seguí Pons	Antonio Juaneda Anglada	PIMEB

Group II: Syndicates

PERMANENT MEMBERS	SUPPLEMENTARY MEMBERS	ORGANIZATION OR INSTITUTION
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Llorenç Pou Garcías	Aurelio Martínez Guerrero	UGT
M. del Carme Orte Socias	Ma Carmen Santamaría Pascual	UGT
Carlos Moreno Gómez	Miguel Ángel Bordoy Garí	UGT



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José Domingo Bonnín Forteza	Dolors Talens Aguiló	Sector pesquer
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Margalida Bordoy Seguí	Rafel Crespi Cladera	Consumidors i usuaris
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Miquel Alenyà Fuster		Govern de les Illes Balears
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Javier Tejero Isla		Consell Insular de Menorca
Bartomeu Planells Planells		Consell Insular d'Eivissa i Formentera

COMMISSION OF ECONOMY, REGIONAL DEVELOPMENT AND ENVIRONMENT

President: Vicenç Tur Tur

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3. Llorenç Pou Garcías (grup II - UGT)	3. Juan Herranz Bonet (grup II - UGT)
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President: Lluís Vallcaneras Nebot

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5. Javier Tejero Isla (Consell Insular Menorca)	5. Miquel Rullan Coll (grup III)
6. Lluís Vallcaneras Nebot (grup III - medi ambient)	6. Antoni Fuster Zanoguera (grup III - ent. locals)

COMMISSION OF SOCIAL AFFAIRS

President: Pendent de designació

PERMANENT MEMBERS	SUPPLEMENTARY MEMBERS
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2. Gabriel Rosselló Homar (grup I - CAEB)	2. Salvador Servera Jaume (grup I - CAEB)
3. M. del Carmen Orte Socías (grup II - UGT)	3. Margarita Báñez Moreno (grup II - UGT)
4. Julia Sánchez Moreno (grup II - CCOO)	4. Agustina Canosa Valdomar (grup II - CCOO)
5. Miquel Alenyà Fuster (grup III - expert Govern)	5. José Domingo Bonnín Forteza (grup III - sector pesquer)
6. Margalida Bordoy Seguí (grup III)	6. Magdalena Bordoy Seguí (grup III)





Study for a System of Indicators for Integrated Coastal Zone Management in the Balearic Islands



Authors and acknowledgements

This work was carried out by Amy Diedrich¹, Joaquín Tintoré¹, Ferran Naviés², Viéns Tur², and Enrique Tortosa¹

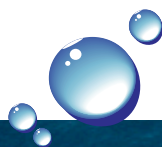
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Photography by Enrique Vidal Vijande

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The authors would also like to thank the members of the ordinary Working Commissions of the Economic and Social Council of the Balearic Islands (CES) for their contributions.



Summary

This work forms part of the activities of IMEDEA's (CSIC-UIB) (Mediterranean Institute of Advanced Studies) Integrated Coastal Zone Management Unit (UGIZC), created in 2005 in collaboration with the Government of the Balearic Islands. This research unit is an ambitious collaboration that was created to respond to the need for scientific research as a key element for achieving sustainable management of the coast in the Balearic Islands. The objective of the resulting project, i+I+D GIZC, is to carry out scientific research, technological development and encourage knowledge transfer and innovation to achieve science-based Integrated Coastal Zone Management.

This document presents a proposal and implementation plan for a System of Indicators for Integrated Coastal Zone Management (ICZM) in the Balearic Islands, developed by IMEDEA over the period of November 2006 - December 2007 in collaboration with the Economic and Social Council of the Balearic Islands (CES), as a component of the i+I+D GIZC project. The main objective of this work is to develop a tool that will help achieve sustainability of coastal areas that is based on scientific knowledge, in line with related works at the international level, while responding to the specific needs of the islands' society.

The proposal of a system of indicators for ICZM in the Balearic Islands was developed in two main phases. Phase I began with the definition of a series of objectives for achieving ICZM in the Balearic Islands. These objectives were classified in three categories: governance, socio-economics and environment. These three axes represent the main pillars of sustainability in coastal areas. In order to respond to these objectives, a list of indicators was created based on an extensive analysis and assessment of international standards and antecedents and associated meetings between researchers from IMEDEA (CSIC-UIB) and members of the working committees of the CES in order to tailor the indicators to reflect local needs and realities. The final result was a proposal for 56 indicators, each one related to a well-defined objective in one of the three categories.

The indicators presented in Phase I constitute an exhaustive and consensual list, elaborated from the

analysis of international initiatives and experiences, IMEDEA's own study and contributions from representatives of the CES. In Phase I, there were some important aspects that were not approached, such as the availability of data, measurement methodology, cost, etc. These matters are of vital importance to the successful implementation of a system of indicators. In this context, Phase II of the project was intended to develop specific recommendations to help ensure the implementation of the system. Following the suggestions from the CES in a meeting in June 2007, the main activities in Phase II included:

I. Ranking of the indicators based on a viability analysis and an estimate of the cost (time, personnel, technology) of developing and/or applying each indicator.

II. Recommendations for developing, maintaining and communicating information related to the indicators, specifically, the identification of the group, institutions and bodies that could or should be responsible for each of them.

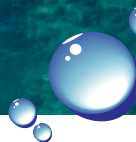
The specific tasks that were carried out in Phase II include:

1. Viability Analysis.

A viability analysis was carried out for each of the indicators proposed in Phase I. To do this, seven parameters were used, ranked on a scale of one to three (1 = low viability, 3 = high viability). The parameters used were: 1) availability of data, 2) availability of data at specified spatial scales, 3) availability of data at specified temporal scales, 4) state of development of methodology for calculating indicator, 5) complexity of management of indicator, 6) highlights tendencies over time, and 7) provides a response to a specific objective related to sustainability or ICZM (based on methodology in Borja et al. 2004, see Annex 5 for more details on scoring system).

2. Estimate of cost.

An estimate of cost was carried out for each of the indicators. The estimate was based on the dedication of personnel and technology that would be required for its development, implementation and measurement.



3. Designation of level of importance and Delphi study.

Independently of the viability analysis and estimation of costs, the indicators were also ranked on the basis of their perceived overall importance (high, medium, low) for monitoring sustainability and ICZM-related objectives for coastal areas in the Balearic Islands. This was considered important on the basis that the viability scores were based largely on objective measurements, which resulted in the fact that many indicators which are highly important (in particular environmental) had low viability scores as a result of being costly and complicated to measure. A first ranking of importance was carried out by IMEDEA. Following this, on 7th November 2007 IMEDEA researchers carried out a Delphi Study with thirteen members of the working committees of the CES to ensure that IMEDEA's ranking was in line with the priorities of Balearic society. Specifically, members marked their personal opinion on importance of each indicator using the scale of 1 (very low) to 5 (very high). Average scores were compared with IMEDEA's own scores, and if they were different (which only happened in eleven cases) they were debated and adjusted to reflect the opinion of the CES (except in the case of environmental indicators where IMEDEA was considered the expert opinion). Thus the final level of importance represents the importance of the indicator from a social and scientific perspective.

4. Ranking of indicators based on (1) level of viability and (2) level of importance.

The ranking of indicators based on the assessment of viability (e.g. high, medium and low) and the level of importance (e.g. high, medium and low) is presented in the form of two tables. These tables represent two complementary perspectives that can help with decisions regarding which indicators should be implemented in the absence of resources to implement the entire system: where resources (human, technical, etc.) are limiting factors, the viability ranking would be a more important reference since indicators with high viability require minimal or no resources to implement. If resources are available, the table of importance would be a better reference since it represents a more complete system of indicators with respect to measuring sustainability objectives.

5. Recommendations for the development of indicators.

Based on the previous actions, general and specific recommendations were generated related to the implementation of the system and for each individual indicator.

Phase II was completed in November 2007 and, in December 2007, the proposal was formally adopted by the CES as Official Opinion 5/2007 (Dictamen 5/2007). The final proposal is presented in this document.





Introduction

The preservation of the environment and the restoration of coastal zones are essential elements for guaranteeing sustainability in the coastal zone of the Balearic Islands and, additionally, to ensure the quality of life of residents, the competitiveness of economic activities, and conservation of natural resources and cultural values.

Coastal areas are extremely complex socio-ecological systems, which play a vital role in global cycles and are especially sensitive to the effects of global change. In the Balearic Islands there is already evidence of changes in coastal areas with social, economic and environmental repercussions related to, for example, water quality, beach erosion, loss of fisheries, degradation of *Posidonia oceanica*, proliferation of invasive species, extreme weather events and floating waste.

In the Balearic Islands, tourism is one of the main engines of the economy and is maintained on a coastline that is still exceptional in many places. Tourist activity requires specific infrastructures and produces a series of impacts on the environment that should be minimised, in particular in islands where territory is the most limited resource. Natural resources should be preserved, restored and managed in an integrated way, systematically taking into account advances in scientific knowledge. This implies, in particular, the transfer of scientific knowledge generated at international and local levels, and the adaptation to changes through innovation of systems of coastal management that respond to scientific progress.

In addition to facing the threats mentioned previously, which are characteristic of many coastal zones throughout the world, the Balearic Islands possess all the elements of insularity that challenge the achievement of sustainability in the coastal zone. These include, among others, limited resources, waste management, and heightened sensitivity to environmental and socio-economic change.

The pressure exerted on the coastline by sectors such as tourism and more recently construction, would suggest that the carrying capacity of some coastal areas has already been surpassed. As global change becomes a reality, this pressure will become more intense. However, there are few viable data to

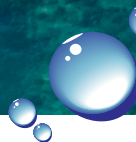
support this type of intuitive statement. Often, there is no single operational definition for frequently-used concepts such as carrying capacity or sustainability. This makes it impossible in many cases to establish specific limits that can be used as regulatory mechanisms related to coastal management. However, this need to learn more and make the most of technology should not be an excuse not to act; rather, it necessitates the use of tools such as indicators for monitoring and understanding change.

To respond to the needs illustrated above, IMEDEA (CSIC-UIB) is collaborating with the Government of the Balearic Islands on the project "Investigación, Desarrollo Tecnológico e Innovación para la Gestión Integrada de la Zona Costera, I+D+i GIZC Balears" (Research, Technological Development and Innovation for Integrated Coastal Zone Management, R&D ICZM Balearic Islands).¹ The main objective of the project is to generate scientific knowledge to facilitate the achievement of sustainability in coastal areas of the Balearic Islands, including environmental, socio-cultural, economic and political factors. In this context, the aim is to reach an integrated understanding of interdisciplinary coastal processes and their interaction at different spatial and temporal scales as key elements of their management. ICZM is considered an appropriate tool for achieving sustainability in the coastal zone of the Islands. One of the essential components of the project, therefore, is the development of a list of internationally accepted, locally relevant indicators to assess the current state of the coast, monitor the progress of ICZM objectives and, consequently, assess the sustainability of the coastline in the Balearic Islands.

The aim of the following paragraphs is to provide a general overview of ICZM and indicators, highlighting the importance of this project.

Integrated Coastal Zone Management (ICZM) may be defined as:

[A] process by which rational decisions are made concerning the conservation and sustainable use



of coastal and ocean resources and space. ICZM is grounded in the concept that the management of coastal and ocean resources and space should be as fully integrated as are the ecosystems making up the coastal and ocean realms The process is designed to overcome the fragmentation inherent in both the sectoral management approach and the splits in jurisdiction among levels of government at the land-water interface (Cicin-Sain and Knecht 1998).

In accordance with the definition above, integration should be considered from five inter-related perspectives: Intersectoral, intergovernmental, spatial, science-management, and international (ibid).

The first significant ICZM efforts were initiated in the United States in the mid-1960s. During that decade, Australia and the United Nations Regional Seas Programme also incorporated ICZM into their natural resource management strategies. However, it wasn't until the emergence of a series of international, environmental conferences including the 1972 United Nations Conference on the Human Environment in Stockholm and the 1992 United Nations Conference on Environment and Development in Rio de Janeiro (UNCED), that human impacts on the environment became an issue of primary concern to the international scientific community.

Agenda 21, a document resulting from UNCED, represents one of the most significant, holistic, international movements towards recognizing the importance of sustainable development and integrated management of human impacts on natural environments. In recognition of the fact that, "The marine environment – including the oceans and all seas and adjacent coastal areas – forms an integrated whole that is an essential global life-support system and a positive asset that presents opportunities for sustainable development," Chapter 17 of Agenda 21, which deals exclusively with ocean and coastal areas, recommends, "Integrated management and sustainable development of coastal areas, including exclusive economic zones" (United Nations 1992). This recommendation in particular, led to a significant global movement towards ICZM.

The threats to environmental, socio-economic and cultural resources due to human activities along the European coast have become increasingly evident in recent years. Sustainable development is an

essential and multidimensional goal that encompasses a variety of environmental, anthropogenic, temporal, spatial, and institutional scales. In recognition of this, the European Commission has made a number of significant moves towards applying ICZM, which began with the Demonstration Programme from 1996-99, intended to generate consensus on the measures necessary for implementing ICZM. In May 2002, the European Parliament and Council adopted the European Commission's Recommendation Concerning the Implementation of ICZM in Europe (2002/413/EC). With specific reference to the environmental, economic, social, cultural and recreational importance of the coastal zone, Chapter 17 of Agenda 21, and the EU Demonstration Programme, this recommendation outlines the actions member states should take to implement ICZM programmes. The recommendation also recognizes the importance of bridging the gap between practitioners and the scientific community and states that, in order to achieve this, information must be produced that is relevant, credible, reliable and appropriate to the needs of coastal management decision-makers. In response to this, the first High Level Forum on Community Strategies for ICZM, which was held in Spain in 2002, recommended that indicators be developed to assess both sustainability in the coastal zone and the degree to which ICZM is being implemented. This resulted in the formation of a Working Group on Indicators and Data (WG-ID), which was given the task of advising the EU ICZM expert group on how to develop an indicator-based assessment of the coastal zone.

Concurrent with the European movement towards the use of indicators, ten years following UNCED, the Co-Chair's report of the Global Conference on Oceans and Coasts at Rio + 10 held in Paris in 2002, highlighted the importance of indicators at a global scale in the following recommendation:

Improve the linkage between science and management through partnerships that enable more effective use and exchange of data and information to the benefit of communities and society as a whole, by including, inter alia, the socio-economic aspects of marine pollution and physical degradation in the State of the Oceans and Development report, and through the development of environmental and socio-economic indicators measuring the performance of management actions related to oceans and coasts (Cicin-Sain et al. 2001).

In general terms, an indicator may be defined as:

[A measurement that] provides a simplified view of a more complex phenomenon, or provides insights about a trend or even that cannot be readily observed. Thus indicators both quantify information and simplify information (WG-ID, 2002).

The challenges involved in defining appropriate indicators are inherent in this definition. How does one measure a trend that cannot be readily observed? How does one gain a realistic understanding of a complex phenomenon using simplified data? Such questions have resulted in a vast array of scientific documents reporting potential frameworks and models for applying indicators: see for example the general model suggested by Belfiore 2003, the Pressure – State – Response framework developed by the Organization for Economic Cooperation and Development (OECD 2001), the adapted version of this framework developed by the Global International Water Assessment (GIWA) and the European Environment Agency (Driving Forces – Pressure – State – Impact – Response), the Heinz Center's framework for identifying performance indicators (Heinz Center 2004), and the Coastal Resources Center's model for monitoring outcomes of different stages of the ICZM cycle (Olsen 2003). A brief glance at any of these models is sufficient to illustrate the complexity involved in the process of applying indicators.

In addition to the many frameworks for conceptualizing indicators, there are also a large number of generic lists of indicators and informative documents for measuring sustainability and ICZM that have been generated with the intent of standardizing the process of indicator use and for coordinating monitoring efforts. Among others, notable efforts include the Intergovernmental Oceanographic Commission's Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management (IOC 2006); IOC's previous reference guide for the use of indicators for ICZM (IOC 2003); a series of suggested sets of indicators in a special 2003 issue of the journal *Ocean and Coastal Management* (Bowen and Riley; Christian; Ehler; Hanson; Henocque; Kabuta and Laane; Linton and Warner; Olsen; Rice; Talaue-McManus 2003); a list of indicators developed for measuring ICZM on the Catalan Coast of Spain, a methodology which was later applied in the Balearic Islands (Sarda et al. 2005); the Delaware Coastal Zone Environmental Indicators Technical Advisory Committee's list of environmental indicators for Delaware's

Coastal Zone (EITAC 1999); and two sets of indicators developed by the European Commission's WG-ID, which include the ICZM Progress Indicator Set and a core set of 27 indicators for measuring sustainable development in the coastal zone (see WG-ID 2006 and Pickaver et al. 2004). The latter were evaluated through the INTERREG DEDUCE project from 2004-07 (Développement Durable des Zones Côtières Européennes, <http://www.deduce.eu>). To add to the complication, such lists of indicators include a plethora of definitions of different types of indicators that coincide with the aspect of ICZM they are designed to measure. Among others, these include sustainability indicators, progress indicators, process indicators, governance indicators, socio-economic indicators, ecological indicators, and environmental indicators.

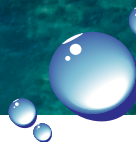
The paragraphs above paint a confusing and disorganized image of indicators yet, by simply highlighting a few examples in each case, they only represent the tip of the iceberg. The massive amount of attention that is being paid to the subject of indicators at the international level may be attributed to two major reasons:

First, ICZM has not been hugely effective in improving the state of the world's coasts. Rather, as populations increase and pressures on natural resources are amplified, the state of the world's coasts is deteriorating. This point is exemplified in the following quotes from a series of significant assessments that have been conducted in recent years, many of which also highlight inefficient management as one of the primary causes of decline:

[T]here is a widespread agreement that our oceans and marine resources are in serious trouble, increasingly affected by rapid growth along our coasts, land and air pollution, unsustainable exploitation of too many of our fisheries resources, and frequently ineffective management (excerpt from a letter to President GW Bush from the US Commission on Ocean Policy, 2004).

[N]early every measure we use to assess the health of ecosystems tells us we are drawing on them more than ever and degrading them, in some cases at an accelerating pace (Burke et al., 2001).

More and more of the narrow strip of land along the world's coasts - and its habitats - has been ruined by a host of poorly planned and badly regulated activities, from the explosive growth of coastal cities and towns



to the increase in tourism, from industrialization to the expansion of fish farming, from the development of ports to measures taken to try to control flooding (Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), *A Sea of Troubles*, 2001).

People picture coasts as an immutable asset, yet damaging and irreversible changes to coastal ecosystems continue unabated. Available trends show that changes in land use in coastal areas outstrip those seen elsewhere; for instance, the growth of artificial surfaces along Europe's coasts is increasing at a rate one third faster than in inland areas. These changes are widespread and driven by a range of factors — demographic changes, economic restructuring, increased living standards and leisure time and global trade patterns. In many coastal regions these factors have caused rapid changes that have drastically altered the potential long-term viability of coastal ecosystems and the services they provide (European Environment Agency, EEA Briefing 03, 2006).

Such deterioration had necessitated quantitative methods for assessing and monitoring ICZM efforts. The only way we can hope to improve our ICZM efforts is through constant, careful vigilance and monitoring.

The second major reason why the subject of indicators is receiving so much attention was highlighted previously — indicators are difficult to define and we have yet to fully understand them. This important point is reflected in the following excerpt from the United Nations Environment Programme's 2007 synthesis report on the findings of the Millennium Ecosystem Assessment (UNEP 2006):

Monitoring is a crucial component of any management strategy. It is best used by applying indicators. Given the substantial deficiencies in understanding marine and coastal ecosystems, the development of indicators for biophysical and socioeconomic responses to management measures is currently limited. Indicators for institutional and governance responses are available to an even lesser degree.

Although standardized methods and lists such as those provided in the IOC Handbook (2006) are extremely useful, they cannot hope to capture the complexity of the issues facing every nation's coastline. ICZM and indicators are not generic, rather, they are site specific and restricted by political and local realities and by the availability of financial, technical

and human resources. Entities wishing to select a series of indicators to measure ICZM must first identify the main goals and objectives associated with managing the coast in their respective countries. This entails identifying major issues and problems affecting these areas. Once these have been identified, viable indicators must be defined.

From a scientific point of view, viability includes indicators with the following characteristics (IOC 2006):

- **Easy to measure.** Indicators should be available at the spatial and temporal scales necessary to support decision making. Necessary technology and data should be readily available.
- **Cost effective.** Indicators should not be too expensive to measure (based on available resources).
- **Concrete.** Indicators should be unambiguous, they should be directly observable and measurable.
- **Interpretable.** Indicators should be easy to interpret (e.g. trends should be meaningful, cause-effect relationships should be clear).
- **Grounded in scientific theory.** The indicator methods should be based on solid scientific theory and, ideally, pretested in various locations.
- **Sensitive.** Indicators should be sensitive to the changes (trends, impacts etc.) they are designed to measure.
- **Responsive.** Indicators should measure the response of the system to management actions.
- **Specific.** There should be a specific relationship between the indicator and what they are designed to measure, ideally, in the absence of other influences.

From a management perspective, viability entails (ibid.):

- Relevance to management objectives
- Clear linkages to the outcomes being monitored
- Development with involvement of all those involved in management
- They must be part of the management process and not an end in themselves.

Some of the most significant challenges associated with meeting these requirements of viability entail the identification of reliable, consistent data sources, identification of appropriate scales of measurement, and the promotion of coordination and cooperation among the various entities involved in ICZM related activities. In these contexts, defining the list of indicators involves four major elements:

1. Finding a balance between reality and comprehensiveness.

Ideally, one would like to have the resources and capabilities to measure a large number of indicators that address as many aspects of ICZM as possible. However, the reality is that it is unlikely that any government or coastal management entity has the capacity to be entirely comprehensive. Rather, it is necessary to select those indicators that are most important for addressing the pre-defined management objectives and to develop a list that is manageable and realistic in the long-term.

2. Drawing upon significant works on indicator development in order to select internationally accepted, pre-tested indicators.

As illustrated previously, a significant amount of work has already been done to develop indicators that are viable and that have been tested and accepted at an international level. Although the implications of adopting a predefined, generic list of indicators was discussed previously, this does not negate the importance of drawing upon such works as much as possible. Using internationally accepted, pre-tested indicators allows for comparability among data and also helps to ensure the viability and functionality of the measurement.

3. Relying on the input of individuals already engaged in measuring indicators in the Balearic Islands.

Duplication of work is inefficient and a waste of resources, so every effort has been made to coordinate and draw upon local works that were/are already being conducted in the field of indicators. Furthermore, the involvement of experts related to the different disciplines related to sustainability or ICZM and indicators (i.e. biology, social sciences, tourism etc.) is essential for developing a viable list that is based on solid scientific principles. Also, it is important to draw upon data sources already in effect in order to minimize the costs (time, financial, technological) necessary to implement the list of indicators, therefore freeing up resources needed to obtain additional measurements that are essential to assessing and monitoring ICZM in the Balearic Islands.

4. Relying on input from stakeholders.

Stakeholder involvement in the indicator development process is not only essential for ensuring the

resulting list is relevant to current issues and needs, but also to ensure that the list is fully implemented and maintained once the project has been completed. Without the full participation and cooperation of stakeholders, there is little hope of bridging the often evasive gap between science and policy.

Finally, it is necessary to define three more key concepts that form the basis of this joint work between IMEDEA and the CES:

A. Management based on knowledge and scientific progress

It is important to be aware of the fact that scientific progress over the past few years has allowed us to move towards a new form of management of the coastline based on knowledge and reliable data (an example is the Water Framework Directive). Indicators represent an ideal bridge between scientific progress and the information needs of those responsible for environmental management.

B. Adaptive Management

It is important to note that the use of indicators should facilitate adaptive management, an approach that is important to ensure successful ICZM (Cicin-Sain and Knecht 1998). Social-economic-environmental interactions are dynamic and require continuous evaluation and adjustment of management approaches in order to address emerging issues and themes. This is particularly true in a global change context. Where indicators themselves allow for identification of such changes, the list of indicators may also require adjustment to address new developments in the system.

C. Participatory Management: Local Agenda 21

Christie et al. (2005) stress the importance of participatory management for ICZM, namely, that which involves the participation of a diverse range of stakeholders and resource managers in developing management plans and in decision-making related to sustainability or ICZM. This need is also illustrated in the following definition of ICZM:

ICM is a broad and dynamic process that requires the active and sustained involvement of the interested public and many stakeholders with interests in how coastal resources are allocated and conflicts are mediated. The ICM process provides a means by which concerns at local, regional and national levels



are discussed and future directions are negotiated (GESAMP 2001).

Stakeholder participation is essential to successful ICZM not only because the knowledge possessed by diverse parties is important to inform the development of management plans, but also because the consent of resource users and managers is essential to the implementation of new rules and regulations. Many ICZM initiatives fall short once they reach the implementation stage due to limited enforcement capabilities and low levels of compliance with new laws and regulations. Environmental regulations are inherently hard to enforce and regulate and many require voluntary compliance in order to be effective. Participatory management not only ensures that stakeholders and resource managers remain fully informed and aware of new developments but also, by involving them in the ICZM process and incorporating their input and ideas into management plans, it ensures a higher level of consent and compliance with new regulations.

Chapter 28 of Agenda 21 (UNCED 1992) refers specifically to the need for local authorities to adopt local plans of implementation for Agenda 21. The chapter

highlights the importance of participatory management aimed at achieving environmental and socio-economic sustainability at the local level. Two years following the Earth Summit, the European Commission convened the First European Conference on Sustainable Cities and Towns in Aalborg, Denmark. The participants of this conference adopted the Charter of European Cities and Towns towards Sustainability (the Aalborg Charter), which was intended to encourage and support cities and towns wishing to achieve sustainability. This event and a series of conferences that followed have resulted in a significant number of towns and cities in the European Union adopting local Agenda 21 (A21L) action plans. The municipalities of the Balearic Islands represent a notable example of A21L implementation. In 1996, the municipality of Calvià in Mallorca initiated the process of A21L which, with the support of the Government of the Balearic Islands, resulted in a significant number of municipalities becoming involved in the process. As of August 2006, a total of 850 projects related to A21L action plans had been initiated in the Islands, including 318 completed projects. Through these initiatives, municipalities will be beneficiaries and key players in ensuring the successful and sustained implementation of the proposed list of indicators.





Tables of indicators

This section presents the joint proposal from IMEDEA (CSIC-UIB) and CES for a System of Indicators for Integrated Coastal Zone Management in the Balearic Islands. 54 indicators have been proposed in three interrelated categories:

A. Governance: In this table there are eight indicators evaluating the four key aspects of a working system of governance: 1) institutions, 2) legislation, 3) implementation, 4) integration.

B. Socio-economics: In this table there are 41 indicators organised in the following categories: economy; employment and human capital; tourism; use of natural resources; pollution; population, construction and development along the coast; climate change; innovation; and social cohesion. These categories represent the major human driving forces affecting the marine and coastal environment in the Balearic Islands.

C. Environment: In this table there are four indicators. In the majority of cases, environmental indicators have been chosen because they are included in national and international environmental legislation and directives. It is important to bear in mind that although there are relatively few environmental indicators proposed compared to other categories, they are complex and are comprised of a large number of measurements (e.g., there are more than 50 measurements associated with the Water Framework Directive). Furthermore, some dimensions of environmental sustainability are measured through governance

indicators (e.g. area of land and sea protected by statutory designations) and socio-economic indicators (e.g. in the categories of the use of natural resources and pollution).

Each table contains the following elements:

- a. A preliminary paragraph containing the definition of the indicator category and a brief explanation of its relevance to ICZM.
- b. A general objective for the category.
- c. A specific objective related to each indicator.
- d. A list of indicators associated with each objective and the international reference used to obtain said indicator.
- e. A description of the measurements associated with each indicator.
- f. An assessment of the viability of each indicator, based on the methodology presented in Annex 4. The calculations for the viability scores are presented in detail for each indicator in the individual indicator files of Annexes 1-3.
- g. The additional cost of implementing each indicator.
- h. A recommendation for implementation and level of importance of each indicator.

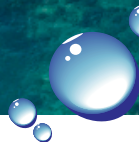


Table A. Governance Indicators

Definition and Justification.

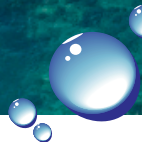
Governance can be defined as 'the process by which various elements in a society exercise power and authority, and consequently influence and pass policies related to public life and social and economic development' (Ehler 2003). In the context of ICZM, a working system of governance should include coordination between a wide group of entities representing various sectors of society in the field (government, private sector, local, not for profit organisations, etc.) and important activities in coastal areas (tourism, fishing, nautical sector, etc.). Governance indicators are defined as those 'designed to measure the performance of the responses to mitigate coastal pressures on the coastal and marine environment. They also measure the progress and quality of the governance process itself, that is, the extent to which a programme is addressing the issue(s) that triggered the development of the programme in the first place' (IOC 2006). Effective governance is key for any ICZM initiative. Without adequate legislation, and its application, the various groups responsible cannot hope to achieve a successful management of coastal areas. In this context, the following list of indicators has been created to evaluate the four key aspects of a working system of governance: 1) institutions, 2) legislation, 3) implementation, 4) integration.

General Objective of Governance.

Guarantee an institutional and legislative framework to plan, implement and achieve ICZM.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Institutions.	Establish a network of organisations at all levels of governance to support and facilitate the implementation of ICZM.	1 Existence and level of activity of organisations supporting ICZM (adapted IOC 2006).	1 Number and characteristics of organisations (government, NGO, community level, local unions, etc.) active in fields related to ICZM. 2 Number and characteristics of organisations directly or indirectly related to regulation or decision-making related to activities affecting the coastal or marine area of the islands (e.g. tourism, building, fishing, management of natural resources, pollution control). 3 Level of influence of these organisations in certain activities related to ICZM.	16 – medium.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Legislation.	Develop, incorporate and implement legislation and rulings in the mandates of organisations involved in ICZM.	2 Existence and adequacy of legislation facilitating ICZM (adapted IOC 2006).	1 Number and description of laws and regulations related to the definition, demarcation, management and/or protection of ocean and coastal areas. 2 Number and description of laws and regulations related to the usage of land, Local Agenda 21, ownership of land, access to the beach, planning usage of coastal areas, control of industrial and commercial activities on the coast, control of recreational activities, fishing, control of pollution, coastal erosion and protection of land, risks on the coast, public participation. 3 Definition of the functions of administration and bodies responsible for the implementation of laws defined by measurements 1 and 2 (link to Indicator 1). 4 Assessment of fulfilment of legislation and sanctions including number of infringements, cases and complaints related to the laws.	16 – medium.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high
	Legally protect the maximum area of land and sea in coastal areas from negative human impacts.	3 Area of land and sea protected by statutory designations (DEDUCE).	1 Area of land and sea protected by statutory designations (DEDUCE).	20 – high.	Low dedication of personnel.	Implement Importance: high
Implementation.	Aid the ICZM process with scientific information derived from the assessment of the environmental impact of proposed activities on coastal areas.	4 Efforts to minimise environmental impact on coastal areas (adapted IOC 2006).	1 Existence and application of legal procedures to apply an Environmental Impact Assessment and/or a strategic environmental assessment of projects, plans and programmes related to coastal and marine areas. 2 Existence and application of private and joint public/private initiatives to minimise/cancel out environmental impact and the use of natural resources. 3 Public programmes to promote/encourage private initiatives in the field of environmental impact. 4 Number of businesses with ISO certification related to the environment and sustainability.	15 – low.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high



Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
	Apply adaptive management to ICZM initiatives to improve and read-just efforts.	5 Existence of mechanisms for the routine control, assessment and adjustment of ICZM initiatives (adapted IOC 2006).	1 The existence, coverage (regarding subject, base data, space and time), nature (own assessment vs. independent assessment) and the quality of operational control and assessment of the regulatory system, including ICZM indicators. 2 The degree of implication of all actors in the monitoring process. 3 Changes in ICZM as a result of information supplied by indicators.	15 – low.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high.
	Guarantee the sustainability of ICZM initiatives through the maintenance of a sufficient flow of human, financial and technical resources.	6 Sufficient availability and adequate distribution of human, financial and technical resources for ICZM (adapted IOC 2006).	1 Scientific research and production of results useful for ICZM. 2 The number, training, experience and function of responsible individuals in ICZM. 3 The budget destined to ICZM activities. 4 The facilities and equipment available for ICZM activities.	15 – low.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high.
	Disseminate relevant information related to ICZM to inform the public and actors involved in coastal areas.	7 Existence, dissemination and application of research and information related to ICZM (adapted IOC 2006).	1 Scientific research and production of results useful for ICZM. 2 The use of these results by those responsible for ICZM. 3 The existence of a scientific committee to assess ICZM. 4 The dissemination of results and general information on ICZM in formats that are useful and comprehensible for the general public, the press and audiovisual media. 5 Public awareness and comprehension of legislation and matters related to protecting the environment and ICZM.	15 – low.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high.
Integration.	Guarantee effective communication and coordination amongst bodies related to ICZM and different political levels and ensure the participation of actors from all levels in the ICZM process.	8 Existence and functioning of a representative coordination mechanism to resolve conflicts in ICZM (adapted IOC 2006).	1 Existence, description and function of a coordinating body for ICZM. 2 Functionality, effectiveness and sustainability of coordination mechanisms.	16 – medium.	A technician for one year to implement indicators 1-8 (not including indicator 3).	Develop a project to assess the system of governance using indicators 1-8. Importance: high.

Table B. Socio-economic Indicators

Definition and Justification.

Socio-economic indicators should be designed to monitor the interaction between human activity and the marine and coastal environment. Socio-economic activity in coastal areas is varied and encompasses various dimensions including economic, environmental, public health, safety and social dimensions (IOC 2006). The achievements of sustainable human activities in coastal areas, the decrease of negative environmental impacts and the increase of benefits derived from sea and coastal resources are fundamental elements for the quality of life of residents of the coastline. Furthermore, on an island that depends mostly on tourism for its economic prosperity, the welfare of residents is completely linked to the sustainability of coastal areas. If the place loses the environmental and cultural features that initially attracted tourists, it is possible that tourists will no longer come. The following dimensions are proposed to group socio-economic indicators: economy; employment and human capital; tourism; use of natural resources; pollution; population, construction and development along the coast; climate change; innovation and; social cohesion. These categories represent the major human driving forces affecting the marine and coastal environment in the Balearic Islands. Adjusting these driving forces and pressures to obtain the minimum negative environmental impact, we improve sustainability in coastal areas and the quality of life of those living there.

General Socio-economic Objective.

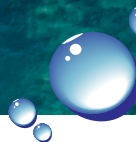
Guarantee quality of life and the sustainable development of the coastal economy.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Economy.	Maintain a healthy, sustainable and productive economy on the coast.	9 Evolution of GDP (Sardà et al. 2005).	1 Total GDP. 2 GDP per capita. 3 Evolution of GDP.	15 – low.	High dedication of personnel.	Implement. Importance: low.
		10 Economic production by sector (adapted IOC 2006).	For the coastal area (activities on land depending on the marine environment): 1 Processing of fish and seafood. 2 Tourism and recreational activities (locals and visitors). 3 Port and nautical activities (persons and goods), including boat construction. 4 Other activities depending on the marine environment. For the marine environment (up to the limit of the Exclusive Economic Zone (EEZ) or the continental shelf). 5 Fishing (commercial, recreational, small-scale). 6 Aquaculture and mariculture. 7 Pharmacology or genetic activity. Exploitation of non-living resources: 8 Oil and gas.	16 – medium.	Low dedication of personnel.	Implement. Importance: medium



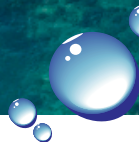
Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
		11 Values (non-market) of sea and coastal economy (IMEDEA/CES).	1 Define economic assessment techniques to determine non-market values of natural resources of natural spaces, biodiversity, habitats and landscapes.	11 – low.	Technician for one year. Cost of implementing a survey study.	Implement. Importance: high.
		12 Direct investment in coastal areas (adapted IOC 2006).	<p>Elements to be considered are as follows:</p> <ol style="list-style-type: none"> 1 Local, regional, or national public costs including: <ol style="list-style-type: none"> a) The cost of scientific research and advice. b) Management and administration costs associated with the generation of economic activity. c) The cost (annual or amortized) of public infrastructure required for the facilitation of commerce (e.g., public port facilities). 2 International or other donor costs or contributions; 3 Sectoral or other user charges or contributions. 4 The value of voluntary contributions, by citizens, non-governmental organizations or industry. <p>Investment should be categorised as follows:</p> <ol style="list-style-type: none"> a) Public investment (can be national, sub-national and local). nacional, subnacional o local). b) Private sector investment (can be commercial investment, including multinational and individual businesses). <p>This indicator also incorporates direct exterior investment (EU, state).</p>	16 – medium.	Low dedication of personnel.	Implement. Importance: medium.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Employment and human capital.	Maximise employment and qualification of human capital.	13 Patterns of sectoral employment (adapted from DEDUCE).	1 Employment by economic activity, job status and place of work (DEDUCE). 2 Foreign workforce. 3 Percentage of foreign workers in total. 4 Seasonal behaviour of employment. 5 Level of activity by sex. 6 Number and characteristics of employment unions.	17 – medium.	Low dedication of personnel.	Implement.
		14 Qualification of human capital (IMEDEA/CES).	1 Level of adjustment of supply and demand of labour according to the level of qualification of human capital. 2 Necessary and required qualifications for employment (percentage of workers with an academic qualification, vocational training or secondary education). 3 Qualifications legally required in the social framework. 4 Capacity for adaptation (percentages of promotion in career path, percentage of changes of profession with qualifications). 5 Desired and imposed mobility. 6 Degree of implementation of law 5/2002.	14 – low.	Medium dedication of personnel.	Implement. Importance: medium.
		15 Unemployment (adapted from Sardà et al. 2005).	1 Number and evolution of unemployed. 2 Level of unemployment and evolution. 3 Evolution of seasonality of unemployment. 4 Foreign unemployment. 5 Qualifications of those unemployed.	20 – high.	Low dedication of personnel.	Implement. Importance: high.
		16 Public service of employment (IMEDEA/CES).	1 Active and passive policies (benefit). 2 Degree of intermediation (effectiveness).	18 – medium.	Low dedication of personnel.	Implement. Importance: low.
Tourism.	Achieve sustainable levels of tourism in coastal areas.	17 Evolution of accommodation supply (Sardà et al. 2005).	1 Number of places (by type of accommodation). 2 Ratio and evolution of places per 100 inhabitants. 3 Evolution of places (by type of accommodation).	18 – medium.	Low dedication of personnel.	Implement. Importance: high.



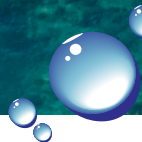
Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
		18 Evolution of complementary tourism supply (IMEDEA/CES).	1 Identification and number of non-accommodation establishments (e.g. restaurants, bars, clubs, cafes, businesses, diving shops, water parks, golf courses, museums). 2 Number of places (e.g. restaurants, bars, cafes). 3 Number of visits to museums, water parks and leisure spaces. 4 Number of trips sold. 5 Index of diversification of complementary offer. 6 Evolution of complementary offer.	14 – low.	Low dedication of personnel.	Implement (adapted version). Importance: high.
		19 Occupation of tourism accommodation supply (IMEDEA/CES).	1 Ratio of occupation of available accommodation (by category of accommodation). 2 Indicator of seasonality of occupation (max-min/min).	21 – high.	Low dedication of personnel.	Implement. Importance: high.
		20 Evolution of tourism demand (IMEDEA/CES).	1 Total foreign tourist arrivals (sea and air). 2 Total national arrivals (air and sea). 3 Ratio of arrivals per inhabitant (national and foreign arrivals). 4 Indicator of seasonality of demand (max. arrivals-min/min).	21 – high.	Low dedication of personnel.	Implement. Importance: high.
		21 Patterns of tourism demand (tourist profile) (IMEDEA/CES).	Questionnaires on: 1 Demographic data of tourists. 2 Activities carried out by tourists. 3 Average length of stay. 4 Average expenditure per stay. 5 Tourist satisfaction levels. 6 Destination loyalty.	14 – low.	Technician for one year. Cost of implementing a study with interviews.	Implement. Importance: medium.
		22 Resident perceptions of tourism (IMEDEA/CES).	Questionnaires on: 1 Demographic data of residents. 2 Resident perceptions of tourism and tourists. 3 Resident satisfaction levels regarding tourism. 4 Opinions about tourism.	11 – low.	Technician for one year. Cost of implementing a study with interviews.	Implement. Importance: medium.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
		23 Quality of tourism accommodation supply (Sardà et al. 2005).	1 Quantity of quality accommodation (number of stars, quality hallmarks). 2 Number of quality stays divided by the total quantity of accommodation. 3 Growth of quality accommodation. 4 Average number of stars per hotel room. 5 m ² (plus %) of beaches with quality mark. 6 Number of hotels with sustainable activities (e.g. reduction of energy/water use, recycling, reusing).	20 – high.	Low dedication of personnel.	Implement. Importance: high.
		24 Cost of tourism accommodation supply (Sardà et al. 2005).	1 Total cost per day of tourist accommodation. 2 Average price per establishment. 3 Average price per hotel room.	19 – high.	Low dedication of personnel.	Implement. Importance: high.
		25 Indicator of residential tourism (IMEDEA/CES).	For residential tourism: 1 Number of second residences divided by total number of homes. 2 Percentage of occupation of second residences. 3 Seasonality of occupation of second residences. 4 Construction of second residences divided by total construction.	14 – low.	Technician for six months.	Implement. Importance: high.
		26 Indicator of second residences of local population (IMEDEA/CES).	For second residences of local population: 1 Number of second residences divided by total number of homes. 2 Percentage of occupation of second residences. 3 Seasonality of occupation of second residences. 4 Construction of second residences divided by total construction.	14 – low.	Technician for six months.	Implement. Importance: medium.



Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
		27 Indicator of public expenditure related to tourism (IMEDEA/CES).	1 Percentage of public expenditure destined towards tourism. 2 Percentage of public expenditure destined towards cleaning services. 3 Percentage of public expenditure destined towards security. 4 Percentage of public expenditure destined towards information and communication. 5 Percentage of public expenditure destined towards promotion of tourism.	19 – high.	Low dedication of personnel.	Implement. Importance: medium.
Use of natural resources.	Decrease anthropogenic pressure on natural resources and maintain sustainable levels of use.	28 Consumption of water (Sardà et al. 2005).	1 Total consumption of water (m ³ /year). 2 Consumption per resident (2001/2004) (m ³ /person/day). 3 Consumption per person (2001) (m ³ /person/day). 4 Annual increase of water consumption. 5 Indicator of seasonality (max-min/min).	20 – high.	Low dedication of personnel.	Implement. Importance: high.
		29 Consumption of electricity (Sardà et al. 2005).	1 Total consumption of electricity. 2 Consumption of electricity per resident. 3 Consumption of electricity per base of population (kw/day). 4 Consumption by sector. 5 Annual growth of consumption. 6 Indicator of seasonality (max. consumption-min/min). 7 Intensity of consumption of electricity.	21 – high.	Low dedication of personnel.	Implement. Importance: high.
		30 Fishing (adapted from Sardà et al. 2005).	1 Total commercial catch. 2 Catch per unit of effort. 3 Change in total catch. 4 Change in catches per unit of effort. 5 Number of stocks in situation of over-fishing (Borja et al. 2004). 6 Evolution of stock biomass (Borja et al. 2004). 7 Number of recreational fishing licenses.	20 – high.	Low dedication of personnel.	Implement. Importance: high.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Pollution.	Minimise pollution in marine and coastal environments.	31 Water treatment (Sardà et al. 2005).	1 Total water treatment. 2 Total percentage of treated water. 3 Percentage of treated water by sector. 4 Treated water per inhabitant. 5 Treatment per temporary population. 6 Change in water treatment. 7 Indicator of seasonality (max. treatment-min/min). 8 Saturation of treatment works. 9 Percentage of water reused.	19 – high.	Low dedication of personnel.	Implement. Importance: high.
		32 Production of urban solid waste (Sardà et al. 2005).	1 Total production. 2 Production per inhabitant (kg/person/day). 3 Production per temporary population. 4 Production by sector. 5 Change in production. 6 Indicator of seasonality (max. production-min/min). 7 Intensity of production.	18 – medium.	Low dedication of personnel.	Implement. Importance: high.
Population, construction and development along the coast.	Minimise the negative effects of population, construction and development on the coast.	33 Existence of routine cleaning of beaches and coastal waters (IMEDEA/CES).	1 Location and frequency of cleaning activities on beaches and in the sea. 2 Waste collected (sea and beach).	119 – high.	Low dedication of personnel.	Implement. Importance: medium.
		34 Density of resident population (Sardà et al. 2005).	1 Absolute population. 2 Population density (inhabitants/km ²). 3 Population growth.	21 – high.	Low dedication of personnel.	Implement. Importance: high.
		35 Seasonality of population (Sardà et al. 2005).	1 Proportion of weighted seasonal population. 2 Base population (weighted seasonal population + resident population). 3 Density of base population. 4 Change in base population. 5 Seasonality indicators. 6 Seasonality of population (ratio of base population regarding resident population).	20 – high.	Low dedication of personnel.	Implement. Importance: high.



Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
		36 Immigration (Sardà et al. 2005).	1 Total immigration (number of foreigners). 2 Density of immigrants (number of foreigners/ resident population). 3 Change in total number of foreigners. 4 Origin of immigration.	20 – high.	Low dedication of personnel.	Implement. Importance: high.
		37 Construction of homes (Sardà et al. 2005).	1 Number of homes built per year. 2 Total number of homes per inhabitant. 3 Change in number of homes. 4 Construction coefficient. 5 Relationship between first and second residences.	21 - high.	Low dedication of personnel.	Implement. Importance: high.
		38 Rate of development of previously undeveloped land (DEDUCE).	1 Rate of development of previously undeveloped land (DEDUCE).	18 – medium.	Medium dedication of personnel.	Implement. Importance: high.
		39 Area of artificial coast (Sardà et al. 2005).	1 Km of artificial coast (first 200 metres of coastline). 2 Percentage of artificial coast. 3 Change in artificial coast.	16 - medium.	Medium dedication of personnel.	Implement. Importance: high.
		40 Number of moorings (Sardà et al. 2005).	1 Total number of moorings. 2 Number of moorings per km of coast. 3 Evolution in number of moorings.	19 - high.	Low dedication of personnel.	Implement. Importance: high.
		41 Existence and use of roads and social infrastructures (IMEDEA/CES).	1 Daily traffic intensity (seasonal DTI). 2 Index of coverage and frequency of transport public by area. 3 Index of users of public transport by month. 4 Number of monthly visits to medical facilities by non residents. 5 Number of doctors, nurses and beds per month relative to actual population (residents and non residents).	19 - high.	Low dedication of personnel.	Implement. Importance: high.
		42 Density of beach users (IMEDEA/CES).	1 Area of beach (sand) available for use. 2 Number of people per 10m ² of beach.	13 – low.	Technician for one year. Installation of necessary technology.	Implement. Importance: medium.
	Minimise the cost of coastal erosion.	43 Coastal regeneration (Sardà et al. 2005).	1 Cubic metres of replaced sand. 2 Cost of replacement per resident. 3 Cost per base population.	19 - high.	Low dedication of personnel.	Implement. Importance: medium.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Climate change	Minimise the impact of climate change on coastal residents and habitats.	44 Natural, human and economic assets at risk (DEDUCE).	1 Protected areas with risk areas. 2 Number living in risk areas. 3 Economic value of goods in risk areas.	12 - low.	Technician for one year.	Implement. Importance: medium.
Innovation.	Maximise innovation contributing to the sustainability of coastal areas.	45 Investment in technology and technological training (IMEDEA/CES).	1 Public/private digital divide. 2 Use of IT in family environment. 3 Level of innovation that minimizes environmental impact.	11 - low.	High dedication of personnel.	Implement. Importance: medium.
Social cohesion.	Maintain a good coverage of social services.	46 Quantity of social services (IMEDEA/CES).	1 Home help services. 2 Day and night centres. 3 Residential centres. 4 Nurseries.	16 - medium.	High dedication of personnel.	Implement. Importance: high.
	Facilitate access to housing.	47 Housing prices (IMEDEA/CES).	1 Price per m ² of new and old houses and rentals.	18 - medium.	Medium dedication of personnel.	Implement. Importance: medium.
		48 Density of occupation of housing (IMEDEA/CES).	1 Density of occupation of housing (new, used and rentals).	14 - low.	Technician for six months.	Implement. Importance: medium.
	Encourage Corporate Social Responsibility (CSR).	49 Corporate Social Responsibility (CSR) (IMEDEA/CES).	1 Investments and contribution (in Euros) destined to autonomous community and outside of autonomous community. 2 Social cost / production ratio.	10 - low.	High dedication of personnel.	Implement. Importance: low.
	Minimise the social effects of seasonality.	50 Social effects of seasonality (IMEDEA/CES).	1 Poverty index (relative and absolute). 2 Ratio of family conciliation. 3 Results, performance and seasonal absenteeism in schools. 4 Percentage of late enrolment in schools.	17 - medium.	High dedication of personnel.	Implement. Importance: high.

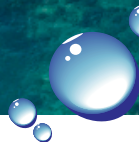


Table C. Environmental Indicators

Definition and Justification.

Environmental indicators measure the condition and tendencies of the state of the ecosystem, especially the biological organisation, functionality and geographical, physical and chemical properties (IOC 2006). They provide information on those factors we consider essential for the health of the ecosystem. They have been chosen to represent the state of the ecosystems (e.g. water quality) or significant impacts upon them (e.g. eutrophication). In the majority of cases, environmental indicators have been chosen because they form part national and international environmental legislation and directives. This is important from a legal perspective but also to allow for comparisons between the Balearic Islands and other European regions, allowing legislators and managers to be on the same level as more advanced regions in these areas.

General Environmental Objective.

Maintain the health and productivity of marine and coastal ecosystems.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Biodiversity.	Conserve the structure, biodiversity and natural resilience of the ecosystem.	51 Biological diversity (adapted IOC 2006).	1 Biodiversity index (number of taxa and populations included in the Balearic Catalogue of endangered species). 2 Evaluation of the state of protection and health of critical habitats and habitats of species in the Natura 2000 network (link with Indicator 3). 3 Number of invasive species. 4 Species at risk of extinction, vulnerable and protected species.	15 – low.	Technician for six months.	Implement. Importance: high.
Beach quality	Maintain the environmental quality of beaches.	52 Quality of beaches (adapted Sardà et al. 2005).	1 Percentage of beaches meeting the requirements of the Bathing Water Directive (76/160/EC). 2 Number of days of beach closure (including cause, e.g. poor microbiological condition, jellyfish).	20 – high.	Low dedication of personnel.	Implement. Importance: high.

Category	Specific Objective	Indicator (Reference)	Measurements	Viability	Additional Cost	Recommendation and Importance
Physical integrity of the coast.	Maintain the physical integrity of beaches, dunes and cliffs.	53 Index of physical integrity (Spanish Coastal Directive Plan).	1 Interannual stability of beaches. 2 Annual variability of plants and profile. 3 Interannual stability of dune field. 4 Vulnerabilitat davant el canvi climàtic. 5 Erosion rate of cliffs.	12 – low.	Dependant on methodology. Technology and staff necessary.	Implement. Importance: medium.
Quality of aquatic ecosystems.	Maintain, monitor and where necessary recover the healthy state of aquatic ecosystems.	54 Indicators associated with the Water Framework Directive (2000/60/EC).	This includes a wide range of indicators and variables associated with the ecological and physical and chemical state of aquatic ecosystems and an analysis of the pressures and impacts upon them. Methodology under development (Balearic Ministry of the Environment).	12 – low.	Obligatory implementation of Directive 2000/60/EC. Unknown cost.	Implement. Importance: high.



Viability and Importance Rankings

This section includes the following tables:

1. Viability Ranking: Indicators have been ordered taking into account first their viability scores and then their level of importance.

2. Importance Ranking: Indicators have been ordered taking into account first their level of importance and then their viability scores.

These tables represent two complementary perspectives that can help with decisions regarding which indicators should be implemented in the absence of resources to implement the entire system: where resources (human, technical, etc.) are limiting factors, the viability ranking would be the most appropriate reference since indicators with high viability require little if no resources to implement. If resources are available, the table of importance would be a better reference since it represents a more complete system of indicators with respect to measuring sustainability objectives.

Table 1. Viability ranking

Indicators	Category (original no.)	Viability	Importance
1 Area of land and sea protected by statutory designations	Governance 3	20 – High	High
2 Unemployment	Socio-economics 15	20 – High	High
3 Occupation of tourism accommodation supply	Socio-economics 19	21 – High	High
4 Evolution of tourism demand	Socio-economics 20	21 – High	High
5 Consumption of water	Socio-economics 28	20 – High	High
6 Consumption of electricity	Socio-economics 29	21 – High	High
7 Fishing	Socio-economics 30	20 – High	High
8 Water treatment	Socio-economics 31	19 – High	High
9 Density of resident population	Socio-economics 34	21 – High	High
10 Seasonality of population	Socio-economics 35	20 – High	High
11 Immigration	Socio-economics 36	20 – High	High
12 Construction of homes	Socio-economics 37	21 – High	High
13 Number of moorings	Socio-economics 40	19 – High	High
14 Existence and use of roads and social infrastructures	Socio-economics 41	19 – High	High
15 Quality of beaches	Environment 52	20 – High	High
16 Quality of tourism accommodation supply	Socio-economics 23	20 – High	High



Indicators	Category (original no.)	Viability	Importance
17 Cost of tourism accommodation supply	Socio-economics 24	19 – High	High
18 Existence of routine cleaning of beaches and coastal waters	Socio-economics 33	19 – High	Medium
19 Regeneration of the coastline	Socio-economics 43	19 – High	Medium
20 Indicator of public expenditure	Socio-economics 27	19 – High	Medium
21 Existence and level of activity of organisations supporting ICZM	Governance 1	16 – Medium	High
22 Existence and adequacy of legislation facilitating ICZM	Governance 2	16 – Medium	High
23 Existence and functioning of a representative coordination mechanism to resolve conflicts in ICZM	Governance 8	16 – Medium	High
24 Patterns of sectoral employment	Socio-economics 13	17 – Medium	High
25 Evolution of tourism accommodation supply	Socio-economics 17	18 – Medium	High
26 Production of urban solid waste	Socio-economics 32	18 – Medium	High
27 Rate of development of previously undeveloped land	Socio-economics 38	18 – Medium	High
28 Area of artificial coast	Socio-economics 39	16 – Medium	High
29 Quantity of social services	Socio-economics 46	16 – Medium	High
30 Negative social effects of seasonality	Socio-economics 50	17 – Medium	High
31 Economic production by sector	Socio-economics 10	16 – Medium	Medium
32 Direct investment in coastal areas	Socio-economics 12	16 – Medium	Medium
33 Housing prices	Socio-economics 47	18 – Medium	Medium
34 Public employment service	Socio-economics 16	18 – Medium	Low
35 Efforts to minimise environmental impact in coastal areas	Governance 4	15 – Low	High
36 Existence of mechanisms for the routine control, assessment and adjustment of ICZM initiatives	Governance 5	15 – Low	High
37 Sufficient availability and adequate distribution of human, financial and technical resources for ICZM	Governance 6	15 – Low	High
38 Existence, dissemination and application of research and information related to ICZM	Governance 7	15 – Low	High
39 Values (non-market) of sea and coastal economy	Socio-economics 11	11 – Low	High
40 Indicator of residential tourism	Socio-economics 25	14 – Low	High
41 Indicators associated with the Water Framework Directive.	Environment 54	12 – Low	High
42 Biological diversity	Environment 51	15 – Low	High
43 Evolution of complementary tourism supply	Socio-economics 18	14 – Low	High
44 Resident perceptions of tourism	Socio-economics 22	11 – Low	Medium
45 Density of beach users	Socio-economics 42	13 – Low	Medium
46 Index of physical integrity	Environment 53	12 – Low	Medium
47 Qualification of human capital	Socio-economics 14	14 – Low	Medium
48 Patterns of tourism demand	Socio-economics 21	14 – Low	Medium
49 Natural, human and economic assets at risk	Socio-economics 44	12 – Low	Medium
50 Investment in technology and technological training.	Socio-economics 45	11 – Low	Medium
51 Indicator of second residences of local population	Socio-economics 26	14 – Low	Medium
52 Density of occupation of housing	Socio-economics 48	14 – Low	Medium
53 Evolution of GDP	Socio-economics 9	15 – Low	Low
54 Corporate Social Responsibility	Socio-economics 49	10 – Low	Low

Key

Category	Number of Indicators	High Importance	Medium Importance	Low Importance
High Viability	20	17	3	0
Medium Viability	14	10	3	1
Low Viability	20	9	9	2

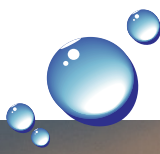
Table 2. Importance Ranking

Indicators	Category (original no.)	Viability	Importance
1 Area of land and sea protected by statutory designations	Governance 3	20 – High	High
2 Unemployment	Socio-economics 15	20 – High	High
3 Occupation of tourism accommodation supply	Socio-economics 19	21 – High	High
4 Evolution of tourism demand	Socio-economics 20	21 – High	High
5 Consumption of water	Socio-economics 28	20 – High	High
6 Consumption of electricity	Socio-economics 29	21 – High	High
7 Fishing	Socio-economics 30	20 – High	High
8 Density of resident population	Socio-economics 31	21 – High	High
9 Seasonality of population	Socio-economics 34	20 – High	High
10 Immigration	Socio-economics 35	20 – High	High
11 Construction of homes	Socio-economics 36	21 – High	High
12 Water treatment	Socio-economics 37	19 – High	High
13 Number of moorings.	Socio-economics 40	19 – High	High
14 Existence and use of roads and social infrastructures	Socio-economics 41	19 – High	High
15 Quality of beaches	Environment 52	20 – High	High
16 Quality of tourism accommodation supply	Socio-economics 23	20 – High	High
17 Cost of tourism accommodation supply	Socio-economics 24	19 – High	High
18 Existence and level of activity of organisations supporting ICZM	Governance 1	16 – Medium	High
19 Existence and adequacy of legislation facilitating ICZM	Governance 2	16 – Medium	High
20 Existence and functioning of a representative coordination mechanism to resolve conflicts in ICZM	Governance 8	16 – Medium	High
21 Patterns of sectoral employment	Socio-economics 13	17 – Medium	High
22 Evolution of tourism accommodation supply	Socio-economics 17	18 – Medium	High
23 Production of urban solid waste	Socio-economics 32	18 – Medium	High
24 Rate of development of previously undeveloped land	Socio-economics 38	18 – Medium	High
25 Area of artificial coast	Socio-economics 39	16 – Medium	High
26 Quantity of social services	Socio-economics 46	16 – Medium	High
27 Negative social effects of seasonality	Socio-economics 50	17 – Medium	High
28 Efforts to minimise environmental impact in coastal areas	Governance 4	15 – Low	High
29 Existence of mechanisms for the routine control, assessment and adjustment of ICZM initiatives	Governance 5	15 – Low	High
30 Sufficient availability and adequate distribution of human, financial and technical resources for ICZM	Governance 6	15 – Low	High
31 Existence, dissemination and application of research and information related to ICZM	Governance 7	15 – Low	High

Indicators	Category (original no.)	Viability	Importance
32 Values (not market) of sea and coastal economy	Socio-economics 11	11 – Low	High
33 Indicator of residential tourism	Socio-economics 25	14 – Low	High
34 Indicators associated with the Water Framework Directive	Environment 54	12 – Low	High
35 Biological	Environment 51	15 – Low	High
36 Evolution of complementary tourism supply	Socio-economics 18	14 – Low	High
37 Existence of cleaning routines for beaches and coastal waters	Socio-economics 33	19 – High	High
38 Regeneration of the coastline	Socio-economics 43	19 – High	Medium
39 Indicator of public expenditure	Socio-economics 27	19 – High	Medium
40 Economic production by sector	Socio-economics 10	16 – Medium	Medium
41 Direct investment in coastal areas	Socio-economics 12	16 – Medium	Medium
42 Housing prices	Socio-economics 47	18 – Medium	Medium
43 Resident perceptions of tourism	Socio-economics 22	11 – Low	Medium
44 Density of beach users	Socio-economics 42	13 – Low	Medium
45 Index of physical integrity	Environment 53	12 – Low	Medium
46 Qualification of human capital	Socio-economics 14	14 – Low	Medium
47 Patterns of tourism demand	Socio-economics 21	14 – Low	Medium
48 Natural, human and economic assets at risk	Socio-economics 44	12 – Low	Medium
49 Investment in technology and technological training.	Socio-economics 45	11 – Low	Medium
50 Indicator of second residences of local population	Socio-economics 26	14 – Low	Medium
51 Density of occupation of housing	Socio-economics 48	14 – Low	Medium
52 Public employment service	Socio-economics 16	18 – Medium	Low
53 Evolution of GDP	Socio-economics 9	15 – Low	Low
54 Corporate Social Responsibility	Socio-economics 49	10 – Low	Low

Key

Order of implementation and designation of resources	Number of Indicators	High Viability	Medium Viability	Low Viability
High Importance	36	17	10	9
Medium Importance	15	3	3	9
Low Importance	3	0	1	2



Specific recommendations for the implementation of the System of Indicators for ICZM in the Balearic Islands

The creation and implementation of a system of indicators to monitor the sustainability of the coastal zone of the Balearic Islands is vital to ensure the quality of life of present and future generations of the Islands' residents. In this context, the following recommendations are proposed to implement the System of Indicators for ICZM in the Balearic Islands:

Undertake the actions and ensure the availability of resources necessary to implement the system of indicators, giving priority to the most important and viable indicators. Bearing in mind the viability and importance rankings presented in the previous tables, it is vital to implement indicators according to their level of viability and importance. The ideal situation from a scientific point of view would be to prioritise indicators according to their level of importance, beginning with the first highly important 36.

If it is not initially realistic to consider the implementation of all the indicators, the twenty most viable could easily be implemented. In this case, it would be important to make the effort to implement other (highly important) indicators with the objective of completing those areas (governance and environment) that are insufficiently represented by the twenty most viable indicators.

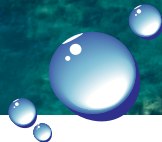
Take the necessary actions to identify and incorporate works directly related to obtaining and implementing indicators (past, present and future) to ensure maximum efficiency in the implementation of the system. For example, works such as the System of Environmental Information for the Balearic Islands (SIABAL) which was developed in the I+D+i GIZC Balears

project represents an important step towards the implementation of several of the indicators included in the system.

Adapt/create the legislation necessary to regulate and support the implementation of the system of indicators. Given that there are various public administrations that already have the structure and information necessary to implement a number of the indicators, we must encourage the necessary actions for an efficient coordination between all parties. This is especially important for highly important and viable indicators. A legal guarantee to ensure the implementation and maintenance of this important initiative could be very useful. We recommend the Balearic Institute for Statistics (IBESTAT) as the appropriate body to ensure efficient coordination of the system.

Create a coastal environmental observatory where indicators may be accessed and analyzed (Balearic ICZM Observatory). It is important that IBESTAT has at its disposal the resources to create and maintain an observatory, which could be called the Balearic ICZM Observatory, where the indicators can be accessed by the public and those managing coastal areas. Those responsible for each indicator should provide IBESTAT with new information annually (or when necessary) in the necessary format so that IBESTAT may update the indicators periodically. The observatory would not only serve as a central mechanism for the indicators. In addition, it could adopt the following operational objectives:

- Centralise information on coastal areas generated in the Balearic Islands by various administrations, public and private bodies and businesses.



- Make this information accessible to users and administrations using tools such as GIS and web pages.
- Create links with other related initiatives at national and international levels. Thus it would serve as a platform to learn about initiatives related to ICZM at regional, national, European and international levels.

Understand that the system of indicators for ICZM in the Balearic Islands is an open system. It is especially important to keep track of the work carried out by the European Commission in the field of sustainability indicators in order to continually update the indicator system.



Bibliography

Balaguer, P., R. Sardà, M. Ruiz, A. Diedrich, G. Vizoso and J. Tintoré. 2008 A proposal for boundary delimitation for ICZM initiatives. *Ocean & Coastal Management*. In press.

Belfiore, S. 2003. The Growth of Integrated Coastal Zone Management and the Role of Indicators in Integrated Coastal Zone Management: Introduction to the Special Issue. *Ocean and Coastal Management* 46: 255-23a.

Balaguer, P., R. Sardà, M. Ruiz, A. Diedrich, G. Vizoso and J. Tintoré. 2008 A proposal for boundary delimitation for ICZM initiatives. *Ocean & Coastal Management*. In press.

Blázquez, M., Murray, I. y Garau, J. M. (2003). El tercer boom. Indicadors de sostenibilitat del turisme a les Illes Balears 1989-1999. Palma: Centre d'Investigació i Tecnologies Turístiques de les Illes Balears, Conselleria de Turisme del Govern de les Illes Balears y Leonard Muntaner Editor. ISBN: 84-95360-47-0.

Borja, A., I. Galsarsoro y J. Franco. 2004. Observatorio de la Biodiversidad del Medio Marino de la Costa Vasca: Indicadores medioambientales marinos. Informe de la Fundación AZTI para la Dirección de Biodiversidad del Departamento de Ordenación del Territorio y Medio Ambiente, del Gobierno Vasco. 115 pp.

Bowen, R.E. and C. Riley. 2003. Socio-economic Indicators and Coastal Management. *Ocean and Coastal Management* 46: 299-312.

Bruntland, G. (ed.). 1987. Our Common Future: The World Commission on Environment and Development, Oxford: Oxford University Press.

Burke, L., Y. Kura, K. Kassem, C. Revenga, M. Spalding and D. McAllister. 2001. Pilot Assessment of Global Ecosystems: Coastal Ecosystems. World Resources Institute: Washington, DC.

Christian, R.R. 2003. Coastal Initiative of the Global Terrestrial Observing System. *Ocean and Coastal Management* 46: 313-321.

Christie, P., K. Lowry, A.T. White, E.G. Oracion, I. Sievanen, R.S. Pomeroy, R.B. Pollnac, J.M. Patlis, and R.L.V. Eisma. 2005. Key Findings from a Multidisciplinary Examination of Integrated Coastal Management Process Sustainability. *Ocean and Coastal Management* 48: 468-483.

Cicin-Sain, B., and P. Bernal, with S. Belfiore, and J. Barbieri. 2002. Ensuring the Sustainable Development of Oceans and Coasts: A Call to Action – Co-Chairs' Report, The Global Conference on Oceans and Coasts at Rio+10, Paris, UNESCO, December 3-7, 2001. Newark, Delaware: Center for the Study of Marine Policy.

Cicin-Sain, B. and R. Knecht. 1998. Integrated Coastal and Ocean Management: Concepts and Practices. Island Press: Washington, D.C.

CITTIB (Centro de Promoción de la Investigación y Las Tecnologías Turísticas). 2002. "El tercer boom. Indicadors de sostenibilitat del turisme de les Illes Balears 1989-1999" CITTIB. Conselleria de Turisme, Govern de les Illes Balears. Palma de Mallorca.

CITTIB (Centro de Promoción de la Investigación y Las Tecnologías Turísticas). 2006. "Tourism in the Balearic Islands, Yearbook 2005." CITTIB. Conselleria de Turisme, Govern de les Illes Balears. Palma de Mallorca.

Consell Econòmic i Social de les Illes Balears. "Memòria del CES sobre l'economia, el treball i la societat de les Illes Balears". Consell Econòmic i Social de les Illes Balears. Palma de Mallorca.

Cullingford, R., Nixon, S., Bjerkeng, B. 2003. Eurowaternet: Technical Guidelines for Implementation in Transitional, Coastal and Marine Waters. Technical Report 97. European Environment Agency, Copenhagen.

Ehler, C.N. 2003. Indicators to Measure Governance Performance in Integrated Coastal Management. *Ocean and Coastal Management* 46: 335-345.

EITAC. 1999. Environmental Goals and Indicators for Delaware's Coastal Zone. Delaware Coastal Programs: Delaware.

European Commission. 2000. The EU Water Framework Directive. 2000/60/EC.

European Commission. 2000. Proposal for a European Parliament and Council Recommendation Concerning the Implementation of Integrated Coastal Zone Management in Europe. COM (2000) 545 final. European Commission, Brussels; 8 September 2000.

EEA. 2006. The Continuous Degradation of Europe's Coasts Threatens European Living Standards. EEA Briefing 03. EEA, Copenhagen.

EEA. 2003. Environmental Indicators: Typology and Use in Reporting. EEA, Copenhagen.

Froude, V. 1998a. An Analysis of Potential Indicator for Marine Biodiversity. Ministry for the Environment, Wellington, New Zealand. Technical Paper 44.

Froude, V. 1998b. Environmental Performance Indicators: An Analysis of Potential Indicators for Fishing Impacts. Ministry for the Environment, Wellington, New Zealand. Technical Paper 43.

Hanson, A.J. 2003. Measuring Progress Towards Sustainable Development. *Ocean and Coastal Management* 46: 381-390.

GESAMP (IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection) and Advisory Committee on Protection of the Sea. 2001. A Sea of Troubles. Reports and Studies GESAMP No. 70.

Gobierno Vasco. 2002. Programa Marco Ambiental de la Comunidad Autónoma del País Vasco (2002-2006). Estrategia Ambiental Vasca de Desarrollo Sostenible (2002-2020).

Henocque, Y. 2003. Development of Process Indicators for Coastal Zone Management Assessment in France. *Ocean and Coastal Management* 46: 363-379.

IOC. 2006. A Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management. Manuals and Guides 46 (ICAM Dossier 2). UNESCO, Paris.

IOC. 2003. A Reference Guide on the Use of Indicators for Integrated Coastal Management. ICAM Dossier 1, IOC Manuals and Guides 45. UNESCO: Paris.

IUCN, UNEP, and WWF. Caring for the Earth: A Strategy for Sustainable Living. Gland, Switzerland, 1991.

Kabuta, S.H. and R.W.P.M. Laane. 2003. Ecological Performance Indicators in the North Sea: Development and Application. *Ocean and Coastal Management* 46: 277-297.

Linton, D.M. and G.F. Warner. 2003. Biological Indicators in the Caribbean Coastal Zone and their Role in Integrated Coastal Management. *Ocean and Coastal Management* 46: 261-276.

OECD. 2001. OECD Environmental Outlook. OECD, Paris.

Olsen, S.B. 2003. Frameworks and Indicators for Assessing Progress in Integrated Coastal Management Initiatives. *Ocean and Coastal Management* 46: 347-361.

Pickaver, A.H., C. Gilbert, and F. Breton. 2004. (An Indicator Set to measure the Progress in the Implementation of Integrated Coastal Zone Management in Europe. *Ocean and Coastal Management*) 47: 449-462.

Projecte I+D+I GIZC. IMEDEA (CSIC-UIB), DG R+D+I del Govern de les Illes Balears. <http://www.costabalearsostenible.com>.

Rice, J. 2003. Environmental Health Indicators. *Ocean and Coastal Management* 46: 235-259.

Sardà, R., C. Avila, and J. Mora. 2005. A Methodological Approach to be used in Integrated Coastal Zone Management Processes: The Case of the Catalan Coast (Catalonia, Spain). *Estuarine and Coastal Shelf Science* 62: 427-439.

Talaue-MacManus, L., S.V. Smith, R.W. Buddemeier and on Behalf of the LOICZ Modeling Team. 2003. Biophysical and Socio-economic Assessments of the Coastal Zone: The LOICZ Approach. *Ocean and Coastal Management* 46: 323-333.

Tintoré, J., M. Jacob, and C. Duarte. 2002. Medi Ambient i Sostenibilitat a les Illes Balears: Un Repte per al Segle XXI. In Informe Econòmic i Social de les Illes Balears. Sa Nostra, Caixa de Balears. Palma de Mallorca. Pages 594 to 600.

UNEP. 2006. Marine and Coastal Ecosystems and Human Well-Being: A Synthesis Report Based on the Findings of the Millennium Ecosystem Assessment. UNEP: Nairobi.

US Ocean Commission on Ocean Policy. 2004. An Ocean Blueprint for the 21st Century. Final Report. Washington, DC.

WG-ID. 2006. Report on the use of the ICZM Indicators from the WG-ID: A Contribution to ICZM Evaluation, Version 1. European Environment Agency, Copenhagen.



Annexes

The following [Annexes 1-3](#) contain an entry for each of the indicators specifying:

1. The international reference (in the event that it was not directly proposed by IMEDEA/CES) for the indicator (e.g. DEDUCE, IOC etc.).
2. The measurements and methodologies developed for the indicator if appropriate. It is important to recognise that, in many cases, existing methodologies are incomplete and, in some cases, have yet to be developed.
3. The sources of existing data, including spatial and temporal scales. In many cases the type and scale of the data available do not correspond to the needs

specified in the methodology. Often, existing data are fragmented, which means that they may be partially available (perhaps in different formats and scales) from a number of different sources.

4. Viability analysis.

5. The additional cost and specific recommendation for the implementation of the indicator.

[Annex 4](#) presents entries for the two indicators eliminated in Phase II.

[Annex 5](#) defines the methodology of the viability analysis.

[Annex 6](#) presents the results of the Delphi study.





Annex 1. Governance Indicators

Indicator 1. Existence and level of activity of organisations supporting ICZM

Reference: adapted IOC 2006

A. Measurements and Methodology

1. Number and characteristics of organisations (government, NGO, community level, employment unions, etc.) active in fields related to ICZM.
2. Number and characteristics of organisations directly or indirectly related to existing regulations or decision-making related to activities affecting the coastal or marine area of the islands (e.g. tourism, building, fishing, management of natural resources, pollution control). The characteristics for measurements 1 and 2 will include:
 - Area of spatial influence
 - Year of creation
 - The number and type of employees
 - Description of budgets, activities, projects and publications
 - Participation in meetings
 - Public education
3. Level of influence of these organisations in certain activities related to ICZM including:
 - Number of laws in which the organisation has power, including the number of instances in which they have been applied satisfactorily or not (link to Indicator 2).
 - Number and description of completed initiatives that have resulted in a change (whether positive or negative) in coastal areas, and those that have resulted in no change.
 - Number and description of initiatives in terms of whether they could result in or are resulting in a change (whether positive or negative) in coastal areas.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	2
Resposta a un objectiu específic relacionat amb la sostenibilitat o la GIZC	3
TOTAL	16

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.



Indicator 2. Existence and adequacy of legislation facilitating ICZM

Reference: adapted IOC 2006

A. Measurements and Methodology

1. Number and description of laws and regulations related to the definition, demarcation, management and/or protection of ocean and coastal areas.
2. Number and description of laws and regulations related to the usage of land, Local Agenda 21, ownership of land, access to the beach, planning usage of coastal areas, control of industrial and commercial activities on the coast, control of recreational activities, fishing, control of pollution, coastal erosion and protection of land, risks on the coast, public participation.
3. Definition of the functions of administration and bodies responsible for the implementation of laws defined by measurements 1 and 2 (link to Indicator 1).
4. Assessment of fulfilment of legislation and sanctions including number of infringements, cases and complaints related to the laws.

This should be measured at the level of each island and municipality and be repeated every three years.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	2
Resposta a un objectiu específic relacionat amb la sostenibilitat o la GIZC	3
TOTAL	16

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.

Indicator 3. Area of land and sea protected by statutory designations

Reference: DEDUCE, direct adaptation of SIF 8.1 (<http://www.dedu-ce.eu>)

A. Measurements and Methodology

The methodology used to calculate this indicator follows the guidelines of the Interreg DEDUCE project referenced above and described in the Standard Indicator Format File (SIF 8.1).

B. Data

Source: Conselleria de Medi Ambient, EEA, Natura 2000.

Spatial scale: Coastal area 10 km. inland and into the sea.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The Conselleria de Medi Ambient should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 4. Efforts to minimise environmental impact in coastal areas

Reference: adapted IOC 2006

A. Measurements and Methodology

1. Existence and application of legal procedures to apply an Environmental Impact Assessment (EIA) and/or a strategic environmental assessment of projects, plans and programmes related to coastal and marine areas.
2. Existence and application of private and joint public/private initiatives to minimise/cancel out environmental impact and the use of natural resources.
3. Public programmes to promote/encourage private initiatives in the field of environmental impact.
4. Number of businesses with ISO certification related to the environment and sustainability.

This should be measured at the level of each island and municipality and be repeated every three years.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

Fragmented data.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	15

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.



Indicator 5. Existence of mechanisms for the routine control, assessment and adjustment of ICZM initiatives

Reference: adapted IOC 2006

A. Measurements and Methodology

1. The existence, coverage (regarding subject, base data, space and time), nature (own assessment vs. independent assessment) and the quality of operational control and assessment of the regulatory system, including ICZM indicators.
2. The degree of implication of all actors in the monitoring process.
3. Changes in ICZM as a result of information supplied by indicator.

This should be measured at the level of each island and municipality and be repeated every three years.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	15

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.

Indicator 6. Sufficient availability and adequate distribution of human, financial and technical resources for ICZM

Reference: adapted IOC 2006

A. Measurements and Methodology

1. Analysis of the National Catalogue of Professional Qualifications needed to implement ICZM.
2. The number, training, experience and function of responsible individuals in ICZM.
3. The budget destined to ICZM activities.
4. The facilities and equipment available for ICZM activities.

This should be measured at the level of each island and municipality and be repeated every three years.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	15

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.

Indicator 7. Existence, dissemination and application of research and information related to ICZM

Reference: adapted IOC 2006

A. Measurements and Methodology

1. Scientific research and production of results useful for ICZM.
2. The use of these results by those responsible for ICZM.
3. The existence of a scientific committee to assess ICZM.
4. The dissemination of results and general information on ICZM in formats that are useful and comprehensible for the general public, the press and audiovisual media.
5. Public awareness and comprehension of legislation and matters related to protecting the environment and ICZM.

This should be measured at the level of each island and municipality and be repeated every three years.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	15

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.

Indicator 8. Existence and functioning of a representative coordination mechanism to resolve conflicts in ICZM

Reference: adapted IOC 2006

A. Measurements and Methodology

1. Existence, description and function of a coordinating body for ICZM.
2. Functionality, effectiveness and sustainability of coordination mechanisms.
3. The proportion of key actors represented in the coordination team.
4. Effort to implicate actors and communities from coastal areas in the decisions relating to ICZM.
5. Description of actions and activities developed by the coordination team.
6. Financing in the long term to maintain the functions of the coordination team.

This should be measured at the level of each island and municipality and be repeated every three years.

B. Data

Source: Internet, consultation with experts and representatives from identified organisations, public archives.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	2
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	16

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to assess governance using the structure of indicators 1-8. The project will last one year and those responsible should identify and coordinate with other bodies working in the same field to ensure no work is repeated. The project should include a plan so the measurements can be repeated every three years.



Annex 2. Socio-Economic Indicators

Indicator 9. Evolution of GDP

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total GDP.
2. GDP per capita (GDP/population).
3. Evolution of GDP (annual % increase).

This should be measured at the level of municipality and updated annually.

B. Data

Source: IBESTAT.

Spatial scale: Region, island.

Temporal scale: Trimester, year.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	1
TOTAL	15

D. Implementation

Additional cost: High dedication of personnel.

Recommendation: IBESTAT should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 10. Economic production by sector

Reference: adapted IOC 2006

A. Measurements and Methodology

1. For the coastal area (activities on land depending on the marine environment):
 - Processing of fish and seafood.
 - Tourism and recreational activities (locals and visitors).
 - Port and nautical activities (persons and goods), including boat construction.
 - Other activities depending on the marine environment.
2. For the marine environment (up to the limit of the Exclusive Economic Zone (EEZ) or the continental shelf):
 - Fishing (commercial, recreational, small-scale).
 - Aquaculture and mariculture.
 - Pharmacology or genetic activity.
 - Exploitation of non-living resources:
 - Oil and gas.
 - Extraction of solid matter.
 - Wind and wave energy.

This should be measured at different spatial and temporal scales (see below).

B. Data

- Fishing sector: Conselleria d'Agricultura i Pesca.
Spatial scale: Port.
Temporal scale: Daily.
- Tourism sector: CITTIB.
Spatial scale: Island.
Temporal scale: Season, month, year.



- Nautical sector: Ports authority.
Spatial scale: Port.
Temporal scale: Year.
- Energy sector: Conselleria de Comerç, Indústria i Energia.
Spatial scale: Island.
Temporal scale: Year, month.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	1
TOTAL	16

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually. In the case that there are no data for some activities, IBESTAT should identify them.

Indicator 11. Values (non-market) of sea and coastal economy

Reference: IMEDEA/CES

A. Measurements and Methodology

Define economic assessment techniques to determine non-market values of natural resources of natural spaces, biodiversity, habitats and landscapes. Interview techniques.

This should be measured at the level of each island and be repeated every five years.

B. Data

No data.

C. Viability Analysis

Criteria	
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	11

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to do the necessary work to measure this indicator. The project should include a plan so the measurements can be repeated every five years.

Indicator 12. Direct investment in coastal areas

Reference: IOC 2006

A. Measurements and Methodology

This indicator should be measured following the same categories as indicator 10 (Economic Production by Sector).

Elements to be considered are as follows:

1. Local, regional, or national public costs including:
 - a) The cost of scientific research and advice;
 - b) Management and administration costs associated with the generation of economic activity;
 - c) The cost (annual or amortized) of public infrastructure required for the facilitation of commerce (e.g., public port facilities);
2. International or other donor costs or contributions;

3. Sectoral or other user charges or contributions;
4. The value of voluntary contributions, by citizens, non-governmental organizations or industry.

Investment should be categorised as follows:

- a) Public investment (can be national, sub-national and local).
- b) Private sector investment (can be commercial investment, including multinational and individual businesses).
- c) This indicator also incorporates direct exterior investment (EU, state).

This should be measured at the level of island and repeated annually.

B. Data

Public investment: Relevant public administration.

Spatial scale: Municipality.

Temporal scale: Year.

Private investment only exists at the aggregate level of the Conselleria d'Economia, Hisenda i Innovació, INE, FUNCAS.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	16

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually. In the case that there are no data for some activities, IBESTAT should identify them.

Indicator 13. Patterns of sectoral employment

Reference: Adapted from DEDUCE SIF 12.1 (<http://www.deduce.eu>)

A. Measurements and Methodology

- 1 Employment by economic activity, employment status and place of work (see DEDUCE methodology below).
- 2 Foreign workforce.
- 3 Percentage of foreign workers in total.
- 4 Seasonal behaviour of employment.
- 5 Level of activity by sex.

B. Data

Source: SOIB.

Spatial scale: Region, island.

Temporal scale: Year, trimester.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	17

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: SOIB should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.



Indicator 14. Qualification of human capital

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Level of adjustment of supply and demand of labour according to the level of qualification of human capital.
2. Necessary and required qualifications for employment (percentage of workers with an academic qualification, vocational training or secondary education).
3. Qualifications legally required in the social framework.
4. Capacity for adaptation (percentages of promotion in career path, percentage of changes of profession with qualifications).
5. Desired and imposed mobility.
6. Degree of implementation of law 5/2002.

This should be measured at the level of island and municipality.

B. Data

Source: SOIB, Conselleria de Treball i Formació.

Spatial scale: Region in some cases.

Temporal scale: Year.



C. Anàlisi d'idoneïtat

Criteria	Value
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	14

D. Implementation

Additional cost: Medium dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually. In the case that there are no data for some activities, IBESTAT should identify them.

Indicator 15. Unemployment

RReference: adapted Sardà 2006

A. Measurements and Methodology

1. Number and evolution of unemployed.
2. Level of unemployment and evolution.
3. Evolution of seasonality of unemployment.
4. Foreign unemployment.

This should be measured at the level of island, tourism zone and municipality.

B. Data

Source: IBESTAT, SOIB, INEM.

Spatial scale: Region, island, municipality.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually. In the case that there are no data for some activities, IBESTAT should identify them.

Indicator 16. Public employment service

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Active and passive policies (benefit).
2. Degree of intermediation (effectiveness).

This should be measured at the level of island and municipality and repeated annually.

B. Data

Source: SOIB, Conselleria de Treball i Formació.

Spatial scale: Region, island.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	2
Response to a specific objective related to sustainability or ICZM	1
TOTAL	18

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually. In the case that there are no data for some activities, IBESTAT should identify them.

Indicator 17. Evolution of tourism accommodation supply

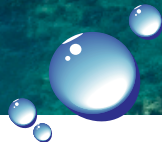
Reference: adapted Sardà et al. 2005

A. Measurements and Methodology

1. Number of places (by type of accommodation).
2. Ratio and evolution of places per 100 inhabitants.
3. Evolution of places (by type of accommodation).

The following establishments should be assessed: Ciudad de vacaciones (CV; holiday cities), Hotels (H), Hotel residencia (HR*), Hotel apartamento (HA), Residencia apartamento (RA), Hostals (HS), Hostal residencia (HSR), Casa de huéspedes (CH; guest houses), Fonda (F) and Pensión (P).

This should be measured at the level of island, tourism zone and municipality.



B. Data

Source: CITTIB.

Spatial scale: Region, island, municipality, tourism zone.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	18

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: CITTIB should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 18. Evolution of complementary tourism supply (not accommodation)

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Identification and number of non-accommodation establishments (e.g. restaurants, bars, clubs, cafes, businesses, diving shops, water parks, golf courses, museums).
2. Number of places (e.g. restaurants, bars, cafes).
3. Number of visits to museums.
4. Number of trips sold.
5. Index of diversification of complementary offer.

This should be measured at the level of island, tourism zone and municipality.

B. Data

Measurements 1 and 2.

Source: CITTIB, town councils.

Spatial scale: Town councils have data for municipalities and CITTIB for tourism zones.

Temporal scale: Year.

There are few data for measurements 3, 4 and 5 and they are not broken down.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	2
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	14

D. Implementation

Additional cost: If measurements 3 and 4 are eliminated, low dedication of personnel.

Recommendation: This should be measured with the elimination of 3 and 4 because they are difficult and expensive to obtain. CITTIB should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.



Indicator 19. Occupation of tourism accommodation supply

Referència: IMEDEA/CES

A. Measurements and Methodology

1. Ratio of occupation of available accommodation (by category of accommodation)
2. Indicator of seasonality of occupation (max-min/min).

The following establishments should be assessed: Ciudad de vacaciones (CV; holiday cities), Hotels (H), Hotel residencia (HR*), Hotel apartamento (HA), Residencia apartamento (RA), Hostals (HS), Hostal residencia (HSR), Casa de huéspedes (CH; guest houses), Fonda (F) and Pensión (P).

This should be measured monthly at the level of island, tourism zone and municipality.

B. Data

Source: CITTIB.

Spatial scale: Region, island, tourism zone.

Temporal scale: Year, trimester, month.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	21

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: CITTIB should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 20. Evolution of tourism demand

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Total foreign tourist arrivals (sea and air).
2. Total national arrivals (air and sea).
3. Ratio of arrivals per inhabitant (national and foreign arrivals).
4. Indicator of seasonality of demand (max. arrivals-min/min).

This should be measured monthly at the level of island, tourism zone and municipality.

B. Data

Source: CITTIB.

Spatial scale: Region, island.

Temporal scale: Year, trimester, month.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	21

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: CITTIB should measure this indicator as specified spatial scales and allow for the results to be incorporated by the Balearic ICZM Observatory annually.



Indicator 21. Patterns of tourism demand (tourist profile)

Reference: IMEDEA/CES

A. Measurements and Methodology

Questionnaires on:

1. Demographic data of tourists.
2. Activities carried out by tourists.
3. Average length of stay.
4. Average expenditure per stay.
5. Tourist satisfaction levels.
6. Faithfulness to destination.

This should be measured at the level of each island and tourism zone and be repeated every five years.

B. Data

Measurement 1 (age, reason for trip, accommodation and package (yes/no) for German, British and Spanish tourists).

Source: CITTIB.

Spatial scale: Region, island, tourism zone.

Temporal scale: Year.

There are only some isolated data associated to specific projects for other measurements.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	14

D. Implementation

Additional cost: If measurements 2-6 are eliminated and measurement 1 is adapted to include only the existing data, low dedication of personnel. To include the other measurements, a researcher would be needed to develop a questionnaire and analyse data. The responsible body would have to collaborate with ports, hotels and/or airports to obtain and maintain data. Initially a researcher/body would be needed to carry out the recommended assessment.

Recommendation: CITTIB should continue updating the data associated with measurement 1 and allow for the results to be incorporated by the Balearic ICZM Observatory annually. Additionally, there should be a call for a project designed to do the work necessary to obtain data for other measurements associated with this indicator. The project should include a plan so the measurements can be repeated every five years.



Indicator 22. Residents' perceptions regarding tourism

Reference: IMEDEA/CES

A. Measurements and Methodology

Questionnaires on:

1. Demographic data of residents.
- 2.. Resident perceptions of tourism and tourists.
- 3.. Resident satisfaction levels regarding tourism.

This should be measured every five years at the level of island, tourism zone and municipality.

B. Data

There are few data, in isolated cases, and specific projects.

C. Viability Analysis

Criteria	
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	11

D. Implementation

Additional cost: One year of work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to do the necessary work to measure this indicator. The project should include a plan so the measurements can be repeated every five years.

23. Quality of tourism accommodation supply

Reference: adapted Sardà et al. 2005

A. Measurements and Methodology

1. Quantity of quality accommodation (number of stars, quality hallmarks).
2. Number of quality stays divided by the total quantity of accommodation.
3. Growth of quality accommodation.
4. Average number of stars per hotel room.
5. m² (plus %) of beaches with quality mark (Blue Flag).
6. Number of hotels with sustainable activities (e.g. reduction of energy/water use, recycling, reusing).

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

Source: CITTIB.

Spatial scale: Island, municipality.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: CITTIB should allow for the results to be incorporated by the Balearic ICZM Observatory annually.

24. Cost of tourism accommodation supply

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total cost per day of tourist accommodation.
2. Average price per establishment.
3. Average price per hotel room.

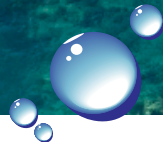
This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

Source: CITTIB.

Spatial scale: Island, municipality, tourism zone.

Temporal scale: Year.



C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: CITTIB should allow for the results to be incorporated by the Balearic ICZM Observatory annually.

25. Indicator of residential tourism

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Number of second residences (non-local) divided by total number of homes.
2. Percentage of occupation of second residences (non-local).
3. Seasonality of occupation of second residences (non-local).
4. Construction of second residences (non-local) divided by total construction.

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

The Spanish Statistics Institute (INE) has data for regions but they are not accurate due to the difficulty in defining second residences.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	14

D. Implementation

Additional cost: Technician for six months.

Recommendation: There should be studies to appropriately define residential tourism and obtain necessary measurements (link with indicator 26).

26. Indicator of second residences of local population

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Number of second residences (local) divided by total number of homes.
2. Percentage of occupation of second residences (local).
3. Seasonality of occupation of second residences (local).
4. Construction of second residences (local) divided by total construction.

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

The Spanish Statistics Institute (INE) has data for regions but they are not accurate due to the difficulty in defining second residence.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	14

D. Implementation

Additional cost: Technician for six months.

Recommendation: INE should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually. This could be considered following or adapting the DEDUCE methodology for indicator 22.1 (second residences and holiday homes, <http://www.deduce.eu>).

27. Indicator of public expenditure

Reference: IMEDEA/CES

A. Measurements and Methodology

Percentage of public expenditure destined for tourism (total).

Broken down into:

1. Percentage of public expenditure destined for cleaning services.
2. Percentage of public expenditure destined for security.
3. Percentage of public expenditure destined for information and communication.
4. Percentage of public expenditure destined for promotion of tourism.

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

Source: Budgets and payments to municipality.

Spatial scale: Municipality.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: IBESTAT should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 28. Water Consumption

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total consumption of water (m³/year).
2. Consumption per resident (m³/person/day).
3. Consumption per person (m³/person/day).
4. Annual increase of water consumption.
5. Indicator of seasonality (max-min/min).

This should be measured monthly at the level of island, tourism zone and municipality.

B. Data

Source: INE.

Spatial scale: Region, island, municipality.

Temporal scale: Year, month.



C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: INE should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 29. Electricity Consumption

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total consumption of electricity.
2. Consumption of electricity per resident.
3. Consumption of electricity per base population (kw day).
4. Consumption by sector.
5. Annual growth of consumption.
6. Indicator of seasonality (max. consumption-min/min).

This should be measured monthly at the level of island, tourism zone and municipality.

B. Data

Source: IBESTAT (contributed by GESA).

Spatial scale: Region, island, municipality, tourism zones (only region for consumption by sector).

Temporal scale: Year, month.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: GESA should measure this indicator, including measurement 4 at the level of municipality, and make the results available for their inclusion in the Balearic ICZM observatory annually.

Indicator 30. Fisheries

Reference: adapted Sardà et al. 2005

A. Measurements and Methodology

1. Catch per unit of effort (including change).
2. Number of stocks in situation of over-fishing.
3. Number of recreational fishing licenses.

This should be measured at the level of island and area of fishing every year.

B. Data

Source: For internal waters, General Directorate of Fisheries, and for marine waters, Spanish Ministry for Farming, Food and Fisheries.

Spatial scale: Fishing areas defined by the General Fisheries Commission for the Mediterranean, island.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually..

Indicator 31. Water treatment

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total water treatment.
2. Total percentage of treated water.
3. Percentage of treated water by sector.
4. Treated water per inhabitant.
5. Treatment per temporary population.
6. Change in water treatment.
7. Indicator of seasonality (max. treatment-min/min).
8. Saturation of treatment works.
9. Percentage of water reused.

The indicator should only take into account water treated through minimal secondary treatment (biological treatment) due to the low quality of water treated by primary treatment (physical and chemical), which does not generate water with minimal ecological quality requirements.

This should be measured at the level of island, tourism zone and municipality and repeated monthly.

B. Data

Source: Balearic Water Agency, private sources.

Spatial scale: Region, island, municipality, tourism zone.

Temporal scale: Year, month.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: Given the great importance of this indicator, which is obligatory in terms of the Water Framework Directive (indicator 54), it is recommended that the Balearic Water Agency and private sources coordinate their work to measure this indicator and allow results to be incorporated in the Balearic ICZM Observatory annually.



Indicator 32. Production of urban solid waste

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total production.
2. Production per inhabitant (kg/person/day).
3. Production per temporary population.
4. Production by sector.
5. Change in production.
6. Indicator of seasonality (max. production-min/min).

This should be measured at the level of island, tourism zone and municipality and repeated monthly.

B. Data

Source: IBESTAT.

Spatial scale: Region, island, municipality, tourism zone.

Temporal scale: Year, month.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	18

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: IBESTAT should allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 33. Existence of routine cleaning of beaches and coastal waters

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Location and frequency of cleaning activities on beaches and in the sea.
2. Waste collected (sea and beach).

This should be measured at the level of beach and following the route of cleaning vessels and be repeated monthly.

B. Data

Source: Conselleria de Medi Ambient.

Spatial scale: Beach and route of cleaning vessel, island.

Temporal scale: Daily during bathing season. In winter only on the beach.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	2
Response to a specific objective related to sustainability or ICZM	3
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The Conselleria de Medi Ambient should allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 34. Density of resident population

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Absolute population.
2. Population density (inhabitants/km²).
3. Growth of population (% per year).

This should be measured at the level of island and municipality and repeated annually.

B. Data

Source: IBESTAT.

Spatial scale: Region, island, municipality.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	21

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: IBESTAT should allow for the results to be incorporated by the Balearic ICZM Observatory annually.



Indicator 35. Seasonality of population

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Proportion of weighted seasonal population.
2. Base population (weighted seasonal population + resident population).
3. Density of base population.
4. Change in base population.
5. Seasonality indicators.
6. Seasonality of population (ratio of base population regarding resident population).

The seasonal population of a municipality is what determines its capacity, bearing in mind second residences, hotels and other tourist accommodation, following these criteria:

- a) Second residences: four places per residence
- b) Hotels and hostels: one place per room
- c) Campsites: 2.5 places per pitch according to capacity

This should be measured at the level of island, tourism zone and municipality and repeated monthly.

B. Data

Source: IBESTAT.

Spatial scale: Region, island, municipality, tourism zone.

Temporal scale: Year, month.



C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: IBESTAT should allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 36. Immigration

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total immigration (number of foreigners).
2. Density of immigrants (number of foreigners/resident population).
3. Change in total number of foreigners (% per year).

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

Source: IBESTAT.

Spatial scale: Region, island, municipality, tourism zone.

Temporal scale: Year, trimester, month.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: IBESTAT should allow for the results to be incorporated by the Balearic ICZM Observatory annually.

Indicator 37. Construction of homes

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Number of homes built per year.
2. Total number of homes per inhabitant.
3. Change in number of homes.
4. Construction coefficient: Period of 6 years varying depending on the data held. $(\Sigma \text{ homes in 6 years} / \text{Pop. at year start}) \times 100$
5. Ratio of first and second residences.

This should be measured at the level of municipality and tourism zone and repeated annually.

B. Data

Source: INE, Conselleria d'Habitatge i Obres Públiques, COAIB, IBESTAT.

Spatial scale: Region, island, municipality, tourism zone.

Temporal scale: Year.



C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	21

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.

Indicator 38. Rate of development of previously undeveloped land

Reference: DEDUCE, direct adaptation of SIF 3.2 (<http://www.deduce.eu>)

A. Measurements and Methodology

The methodology used to calculate this indicator follows the guidelines of the Interreg DEDUCE project referenced above and described in the Standard Indicator Format File (SIF 3.2).

B. Data

Source: EEA.

Spatial scale: Municipality (NUTS5).

Temporal scale: Corine Land Cover 1990 and 2000.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	18

D. Implementation

Additional cost: Medium dedication of a GIS expert.

Recommendation: A GIS technician should measure this indicator and update it with the next Corine Land Cover. Although it would cost more, it would be recommendable to update maps on the use of land in the Balearics independently.



Indicator 39. Area of Artificial coast

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Km of artificial coast (first 200 and 500 metres of coastline).
2. Percentage of artificial coast.
3. Change in artificial coastal area (% per year).

This should be measured at the level of island, tourism zone and municipality and repeated every three years.

B. Data

The I+D+i GIZC project calculated this indicator in 2005 using maps created by the Balearic Association of Architects. There are no more data available.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	16

D. Implementation

Additional cost: Medium dedication of personnel to update maps every three years and calculate the indicator.

Recommendation: Create a call to develop a project to do the necessary work to measure this indicator. The project should include a plan so the measurements can be repeated every three years.

Indicator 40. Number of moorings

Reference: Sardà et al. 2005

A. Measurements and Methodology

1. Total number of moorings.
2. Number of moorings per km of coast.
3. Evolution in number of moorings.

This should be measured at the level of port and be repeated annually.

B. Data

Source: CITTIB.

Spatial scale: Region, island, port, tourism zone.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: CITTIB should allow for the results to be incorporated by the Balearic ICZM Observatory annually.



Indicator 41. Existence and use of roads and social infrastructures

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Daily traffic intensity (seasonal DTI).
2. Index of coverage and frequency of transport public by area.
3. Index of users of public transport by month.
4. Number of monthly visits to medical facilities by non residents.
5. Number of doctors, nurses and beds per month in proportion to actual population (residents and non residents).

This should be measured at the level of island, tourism zone and municipality and repeated monthly (measurement 1).

B. Data

Source: Conselleria de Mobilitat i Ordenació del Territori, Dirección General de Trafico, Conselleria de Salut i Consum.

Spatial scale: Region, island, municipality.

Temporal scale: Year, month (traffic).

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.

Indicator 42. Density of beach users

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Area of beach (sand) available for use.
2. Number of people per 10m2 of beach

This should be measured at the level of beach and repeated monthly

B. Data

Existeixen molt poques dades i només en casos aïllats de projectes específics.

C. Viability Analysis

Criteria	Value
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	13

D. Implementation

Additional cost: Technology and medium dedication of personnel.

Recommendation: The equipment (e.g. cameras on beaches) should be installed and there should be the personnel necessary to measure this indicator.



Indicator 43. Coastal regeneration

Reference: adapted Sardà et al. 2005

A. Measurements and Methodology

1. Cubic metres of sand replaced.
2. Cost of replacement per resident.
3. Cost per base population.

This should be measured at the level of island, beach, tourism zone and municipality and repeated annually.

B. Data

Source: Dirección General de Sostenibilidad de la Costa y del Mar, Ministerio de Medio Ambiente y Medio Rural y Marino.

Spatial scale: Beach, island, municipality, tourism zone.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	19

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.

Indicator 44. Natural, human and economic assets at risk

Reference: DEDUCE, direct adaptation of SIF 27.1 and 27.2 (<http://www.deduce.eu>)

A. Measurements and Methodology

The methodology used to calculate this indicator follows the guidelines of the Interreg DEDUCE project referenced above and described in the Standard Indicator Format File (SIF 27.1 and 27.2).

The measurements include:

1. Number of people living and working in areas at risk.
2. Value of economic losses.

B. Data

See DEDUCE methodology.

C. Viability Analysis

Criteria	Value
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	12

D. Implementation

Additional cost: One year's work by a researcher/body to carry out the recommended assessment.

Recommendation: Create a call to develop a project to do the necessary work to measure this indicator. The project should include a plan so the measurements can be repeated every three years.

Indicator 45. Investment in technology and technological training

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Public/private digital divide.
2. Use of IT in family environment.
3. Level of innovation minimising environmental impact.

This should be measured at the level of island and municipality and repeated annually.

B. Data

There are few data, in specific cases and studies.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	11

D. Implementation

Additional cost: High dedication of personnel.

Recommendation: Measurement 3 is the most important and the General Directorate of R&D should obtain data for at least this measurement. If it does not require a large amount of additional resources, data should also be obtained for the other two measurements.

46. Quantity of social services

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Home help services.
2. Day and night centres.
3. Residential centres.
4. Nurseries.

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

Source: IBAS, Conselleria d'Afers Socials, Promoció i Immigració.

Spatial scale: Region, island, municipality.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	16

D. Implementation

Additional cost: High dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.

47. Housing prices

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Price per m² of new and old houses and rents.

This should be measured at the level of island and municipality and repeated annually.

B. Data

Source: COAIB, , Col·legi d'Arquitectes Tècnics, Ministeri d'Habitatge.

Spatial scale: Region, island, municipality.

Temporal scale: Year.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	2
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	18

D. Implementation

Additional cost: Medium dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.

48. Density of occupation of housing d'habitatges

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Density of occupation of housing (new, used and rents).

This should be measured at the level of island and municipality and repeated annually.

B. Data

Few data – only the housing census (INE) every ten years.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	14

D. Implementation

Additional cost: Technician for six months. Cost of printing and implementing questionnaires.

Recommendation: IBESTAT should measure this indicator and allow for the results to be incorporated by the Balearic ICZM Observatory annually.

49. Corporate Social Responsibility (CSR)

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Investments and contribution (in Euros) destined to autonomous community and outside of autonomous community.
2. Social cost / production ratio.

B. Data

No data.

C. Viability Analysis

Criteria	Value
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	2
TOTAL	10

D. Implementation

Additional cost: High dedication of personnel.

Recommendation: IBESTAT, in collaboration with CES, should adjust the measurements associated with this indicator and develop an adequate methodology to measure it.

50. Negative social effects of seasonality

Reference: IMEDEA/CES

A. Measurements and Methodology

1. Poverty index (relative and absolute).
2. Ratio of family conciliation.
3. Results, performance and seasonal absenteeism in schools.
4. Percentage of late enrolment in schools.

This should be measured at the level of island, tourism zone and municipality and repeated annually.

B. Data

- Measurement 1:
Source: INE.
Spatial scale: Region.
Temporal scale: Year.
- Measurement 2:
Source: Conselleria de Treball i Formació.
Spatial scale: Determined by state or regional agreements.
Temporal scale: Year.
- Measurements 3 and 4:
Source: Conselleria d'Educació i Cultura .
Spatial scale: Schools.
Temporal scale: Academic Year.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	3
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	17

D. Implementation

Additional cost: High dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.



Annex 3. Environmental Indicators

Indicator 51. Biological diversity

Reference: Adapted IOC 2006

A. Measurements and Methodology

1. Index of biodiversity (number of taxa and populations included in the Balearic catalogue of endangered species; species at risk of extinction, vulnerable species and protected species) and surface recovered in terms of biodiversity (surface in the Natura 2000 network).
2. Evaluation of the state of protection and health of critical habitats and habitats of species in the Natura 2000 Network (link with indicator 3).
3. Number of invasive species.

This indicator should be measured at the level of habitat or species habitat (defined by the Natura 2000 network) and be repeated every three years.



B. Data

Source: Conselleria de Medi Ambient.

Spatial scale: The Natura 2000 network is defined for islands but there is little updated information on the health of habitats and invasive species. The data on biodiversity tend to be fragmented and are spatially incompatible.

Temporal scale: There are few historical data for this indicator.

Data on habitats and biodiversity are greater for land, but are virtually inexistent for the marine environment. The majority of studies in marine areas are related to *Posidonia oceanica*. This indicator should be measured at the level of habitat or species habitat (defined by the Natura 2000 network) and be expanded to include more marine habitats.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	15

D. Implementation

Additional cost: Technician for six months.

Recommendation: Defining and monitoring biodiversity in the coastal areas of the Balearics is very important. In this context, although the viability of this indicator is low, studies to define and monitor biodiversity appropriately are recommended.

Indicator 52. Quality of beaches

Reference: adapted Sardà et al. 2005

A. Measurements and Methodology

1. Percentage of beaches fulfilling the requisites of the Bathing Waters Directive.
2. Number of days of beach closure (including cause, e.g. poor microbiological condition, jellyfish).

This should be measured at the level of beach and updated monthly.



B. Data

Source: Measurement 1, Conselleria de Salut i Consum; measurement 2, Conselleria d'Interior, Direcció General d'Emergències.

Spatial scale: Beach (in some cases there are several sampling points for measurement 1 on the same beach).

Temporal scale: IMEDEA has data for measurement 1 for 1993-2006 in the GIS UGIZC database. Data go further back but are not necessary for this analysis.

The Conselleria de Salut i Consum measures the quality of bathing waters every 15 days during the bathing season. The Conselleria d'Interior has data for measurement 2 beginning in 2007.

C. Viability Analysis

Criteria	Value
Availability of data	3
Availability of data at specified spatial scales	3
Availability of data at specified temporal scales	2
State of development of methodology to calculate the indicator	3
Complexity of managing the indicator	3
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	20

D. Implementation

Additional cost: Low dedication of personnel.

Recommendation: The sources listed in section B should coordinate to make the results available to the Balearic ICZM observatory annually.



Indicator 53. Index of physical integrity of coastal areas

Reference: Spanish Coastal Directive Plan

A. Measurements and Methodology

Under development by the General Directorate of the Coast (GDC).

B. Data

The public business SITIBSA conducts aerial photography flights, which would be needed to calculate part of this indicator.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	12

D. Implementation

Additional cost: This indicator has been proposed by the National Coastal Directive and is currently being studied. If the GDC adopts and measures this indicator the cost will be minimal. If it had to be measured by a Balearic entity, the cost would be the dedication of time of individuals and centres with the necessary skills in collaboration with GDC and the Balearic Ministry of the Environment.

Recommendation: Indicators being developed by GDC, Ministry of the Environment. If they are not measured, we recommend that the indicators are developed with respect to specific beaches and areas of interest in the Balearic Islands.



Indicator 54. Indicators associated with the Water Framework Directive

Reference: Water Framework Directive 2000/60/EC

A. Measurements and Methodology

This includes a series of measurements associated with the ecological and chemical state of aquatic ecosystems and an analysis of the pressure and impact on them. The methodology is being developed by the Conselleria de Medi Ambient.

B. Data

No data.

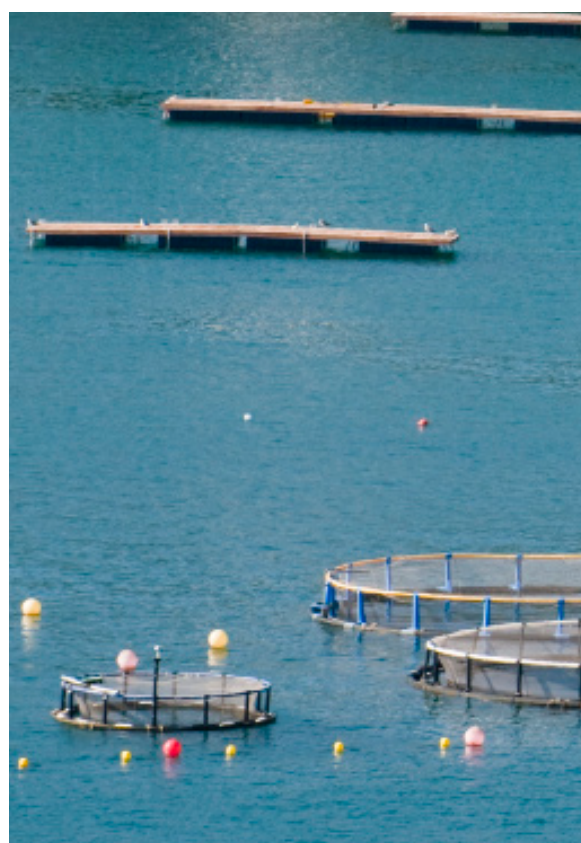
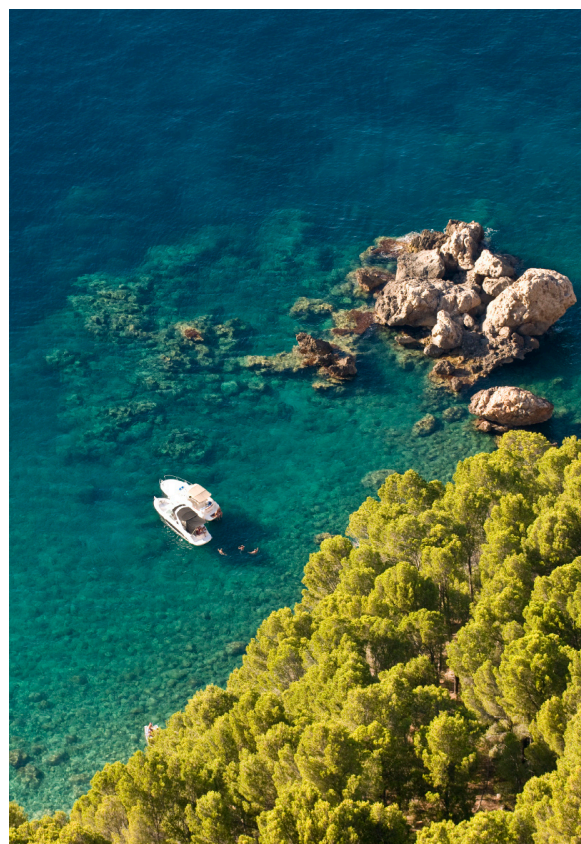
C. Viability Analysis

Criteria	Value
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	2
Complexity of managing the indicator	1
Time responsive	3
Response to a specific objective related to sustainability or ICZM	3
TOTAL	12

D. Implementation

Additional cost: The implementation of the Water Framework Directive (2000/60/EC) is obligatory for all EU member states. The cost cannot be determined before the methodology is developed.

Recommendation: The measurement of indicators associated with the Water Framework Directive is obligatory and also vital for the objectives of ICZM. In this context it is recommended that the Conselleria de Medi Ambient carry on with the necessary efforts to implement the Directive as soon as possible in the Balearic Islands.





Annex 4. Indicators Eliminated in Phase II

Questionnaires for tourism businesses

Reference: EU group of sustainable tourism

A. Measurements and Methodology

Yearly questionnaires with businesses, or a significant group of them, based on a web site or by mail, classified by categories and typologies, with a wide range of questions on information relevant to results, objectives, operatives and opinions.

B. Data

No data.

C. Viability Analysis

Criteria	Value
Availability of data	1
Availability of data at specified spatial scales	1
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	1
Response to a specific objective related to sustainability or ICZM	2
TOTAL	8

D. Implementation

Recommendation: Eliminate this indicator since it is not very viable and does not represent a response to an objective directly related to sustainability or ICZM.

Corporate Social Responsibility is covered by Indicator 49.

Identification of point and non-point sources of pollution

Reference: IMEDEA/CES

A. Measurements and Methodology

Qualitative and spatial assessment of sources and routes of introduction of pollutants from the land to the marine environment.

B. Data

There are some cartographic data for point sources and very few for non-point ones.

C. Viability Analysis

Criteria	Value
Availability of data	2
Availability of data at specified spatial scales	2
Availability of data at specified temporal scales	1
State of development of methodology to calculate the indicator	1
Complexity of managing the indicator	1
Time responsive	2
Response to a specific objective related to sustainability or ICZM	2
TOTAL	11

D. Implementation

Recommendation: Eliminate this indicator since it is measured through the Water Framework Directive 2000/60/EC (Indicator 44).



Annex 5. Methodology to calculate the viability of indicators

Criteria	Scores
1. Availability of data	Already available (3) New data needed from existing data (e.g. different scales, breakdown) (2) No data (1)
2. Availability of data at specified spatial scales	They exist (or can be calculated easily) for all specified spatial scales (3) They exist for some spatial scales, but more detail needed (e.g. beach, municipality) (2) They do not exist on any spatial scale (1)
3. Availability of data at specified temporal scales	They exist (or can be calculated easily) for all specified temporal scales (3) They exist for some temporal scales, but more detail needed (e.g. month) (2) They do not exist on any temporal scale (1)
4. State of development of methodology to calculate the indicator	Already developed and there are examples of its application (3) Needs more work (2) Undeveloped (1)
5. Complexity of managing the indicator (e.g. time, personnel, infrastructure)	Very easy (3) Moderately easy (2) Very difficult (1)
6. Time responsive	Shows positive and negative tendencies over time responding to an external factor (3) The response is of the type before/after (2) No tendencies (1)
7. Response to a specific objective related to sustainability or ICZM	Totally applicable; response to an objective (3) Only responds in part (2) Does not respond (1)

Based on the methodology defined in Borja et al. 2004.
(3 = High, 1 = Low) High viability ≥ 19 ; Medium 16 – 18; Low ≤ 15



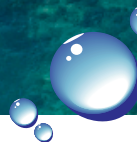
Annex 6. Results of the Delphi Study

Independently of the viability analysis and estimation of cost, indicators were ranked based on their perceived overall level of importance (high, medium, low) for achieving sustainability of coastal areas in the Balearic Islands. A primary ranking of importance was carried out by IMEDEA. On 7th November 2007, a Delphi study was carried out with thirteen expert members of the working commissions of the CES, to ensure IMEDEA's ranking was in line with the priorities of Balearic society. Specifically, members marked their expert opinion on the importance of each indicator using a scale of 1 (very low) to 5 (very high). The

average scores were then compared to IMEDEA's own previously defined levels of importance.

The results of the Delphi study, in the following table, reflect that out of the 56 indicator proposed in Phase I, 45 matched and the other 11 presented only small discrepancies (highlighted in yellow). In these cases, with the exception of environmental indicators where IMEDEA was considered to have the expert opinion, the level was adjusted to reflect the opinion of the CES.

Name	Importance IMEDEA	Importance CES	Agreed	Final Assessment
1 Existence and level of activity of organisations supporting ICZM	High	Medium-High	Yes	High
2 Existence and adequacy of legislation facilitating ICZM	High	Medium-High	Yes	High
3 Area of land and sea protected by statutory designations	High	Medium-High	Yes	High
4 Efforts to minimise environmental impact in coastal areas	High	Medium-High	Yes	High
5 Existence of mechanisms for the routine control, assessment and adjustment of ICZM initiatives	High	Medium-High	Yes	High
6 Sufficient availability and adequate distribution of human, financial and technical resources for ICZM	High	Medium-High	Yes	High
7 Existence, dissemination and application of research and information related to sustainability or ICZM	High	Medium-High	Yes	High
8 Existence and functioning of a representative coordination mechanism to resolve conflicts in ICZM	High	Medium-High	Yes	High
9 Evolution of GDP	Eliminate		No	Low
10 Economic production by sector	Medium	Medium-High	Yes	Medium
11 Values (non-market) of sea and coastal economy	High	Medium-High	Yes	High
12 Direct investment in coastal areas	Medium	Medium	Yes	Medium
13 Patterns of sectoral employment	High	Medium-High	Yes	High
14 Qualification of human capital	Low	Medium	No	Medium
15 Unemployment	High	Medium-High	Yes	High
16 Public employment service	Low	Medium-Low	Yes	Low
17 Evolution of tourism accommodation supply	High	High	Yes	High
18 Evolution of complementary tourism supply	Low	Medium-High	No	High



Name	Importance IMEDEA	Importance CES	Agreed	Final Assessment
19 Occupation of tourism accommodation supply	High	Medium-High	Yes	High
20 Evolution of tourism demand	High	Medium-High	Yes	High
21 Patterns of tourism demand (tourist profile)	Low	Medium	No	Medium
22 Resident perceptions of tourism	Medium	Medium	Yes	Medium
23 Quality of tourism accommodation supply	High	Medium-High	Yes	High
24 Cost of tourism accommodation supply	High	Medium-High	Yes	High
25 Indicator of residential tourism	High	Medium-High	Yes	High
26 Indicator of second residences of local population	High	Medium	No	Medium
27 Indicator of public expenditure	Medium	Medium	Yes	Medium
Questionnaires for tourism businesses	Eliminate	Low	Yes	Eliminar
28 Consumption of water	High	High	Yes	High
29 Consumption of electricity	High	High	Yes	High
30 Fishing	High	Medium-High	Yes	High
Identification of point and non-point sources of pollution	Eliminate	Medium	No	Eliminate since it forms part of indicator 54
31 Water treatment	High	High	Yes	High
32 Production of urban solid waste	High	Medium-High	Yes	High
33 Existence of routine cleaning of beaches and coastal waters	High	Medium-High	Yes	Medium
34 Density of resident population	Medium	Medium-High	Yes	High
35 Seasonality of population	High	Medium-High	Yes	High
36 Immigration	High	Medium-High	Yes	High
37 Construction of homes	High	Medium-High	Yes	High
38 Rate of development of previously undeveloped land	High	Medium-High	Yes	High
39 Area of artificial coast	High	Medium-High	Yes	High
40 Number of moorings	High	Medium-High	Yes	High
41 Existence and use of roads and social infrastructures	High	Medium-High	Yes	High
42 Density of beach users	Medium	Medium-High	Yes	Medium
43 Regeneration of the coastline	Medium	Medium-High	Yes	Medium
44 Natural, human and economic assets at risk	Low	Medium	No	Medium
45 Investment in technology and technological training	Low	Medium	No	Medium
46 Quantity of social services	High	Medium-High	Yes	High
47 Housing prices	Low	Medium	No	Medium
48 Density of occupation of housing	High	Medium	No	Medium
49 Corporate Social Responsibility	Eliminate	Medium-Low	No	Low
50 Negative social effects of seasonality	High	Medium-High	Yes	High
51 Biological diversity	High	Medium-High	Yes	High
52 Quality of beaches	High	Medium-High	Yes	High
53 Index of physical integrity	Medium	Medium	Yes	Medium
54 Indicators associated with the Water Framework Directive 2000/60/EC	High	Medium-High	Yes	High

