

**Measuring Sustainable Development on the Coast**  
**a Report to the EU ICZM Expert Group**  
**by the Working Group on Indicators and Data led by the ETC-TE**  
*(January 2005)*

**Section 1: Background and Purpose of the Report**

**1.1 Background**

Growing concerns about the state of the coast in Europe prompted the European Commission and Member States to establish a 'Demonstration Programme' in 1996 to ascertain best practice in addressing coastal issues.

The outcome of six thematic studies together with the experience of 35 pan-European demonstration projects led to the presentation of two documents by the Commission in September 2000: a *Recommendation concerning the implementation of Integrated Coastal Zone Management*<sup>1</sup> and a *Strategy for Europe*<sup>2</sup>. The Recommendation was adopted by Council and Parliament on 30 May 2002.

*Inter alia*, the Recommendation recognises that good decisions are based on relevant, credible and reliable information. It argues that we need to improve our understanding of coastal and marine processes, and bridge the gap between the scientific and technical community and practitioners. In particular, the Recommendation calls for an integrated approach to monitoring the sustainable development of the coastal zone. Such an approach would provide information in appropriate and compatible formats relevant to the needs of end users at all spatial levels – European, regional seas, Member States, regions and localities.

Responding to the Recommendation, the first High Level Forum on Community Strategies for Integrated Coastal Zone Management, held in Spain in October 2002<sup>(3)</sup>, commended the use of comparable indicators in assessing both the status of the coast and the degree to which an integrated system of coastal management is being introduced around the European littoral.

The Forum further recommended establishing an 'expert group' to assist Member States and Acceding Countries in developing, where appropriate, a common methodology for responding to the challenges facing the coastal zone and laid out in the EU Strategy.

The EU ICZM Expert Group held its first meeting in October 2002 and agreed to set up a Working Group on Indicators and Data (WG-ID) under the leadership of the European Topic Centre - Terrestrial Environment which would advise the Expert Group on ways in which an indicators-based assessment could be taken forward. The WG-ID was asked to report to the second meeting of the Expert Group in June 2003.

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<sup>1</sup> Commission of the European Communities (2000). Proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe. Brussels COM (2000) 545 final.

<sup>2</sup> Commission of the European Communities (2000). Communication from the Commission to the Council and the European Parliament on Integrated Coastal Zone Management: a Strategy for Europe. Brussels COM (2000) 547 final.

<sup>3</sup> First European ICZM High Level Forum on Community Strategies for Integrated Coastal Zone Management (2002). La Vila Joiosa, Spain

At its meeting of 18 June, the WG-ID proposed that Member States (MS) adopt two sets of indicators. The first set would measure the extent to which ICZM is being implemented, and the second would provide each country with a way of assessing whether it is moving further towards, or away from, a more sustainable future for its coastal zone, and at what pace.

Used together, the two sets should reveal the degree to which implementation of ICZM can be correlated with a more sustainable coast. That is, decisions using an integrated approach should see a positive improvement in the state of the coast with concomitant progress towards sustainable development. The indicators measuring progress in achieving sustainable development of the coast will in turn feed back to give policymakers an indication of the need for further action in ICZM.

The WG-ID also recommended that support should be given, where appropriate, to a proposal for harmonising the spatial representation of coastal data through a pan-European Geographical Information System (GIS).

*The Expert Group accepted the proposals in principle but asked the WG-ID to clarify its recommendations and report back to its next meeting in spring 2004.*

In particular, the Expert Group asked for:

- a preliminary road test of the proposed indicator to measure the progress of ICZM implementation;
- a rationale for the choice of the proposed set of indicators of sustainable development of the coastal zone;
- details of how the indicators of sustainable development would be measured;
- an example or two of a worked-up indicator; and,
- suggestions as to how the indicator work could be taken forward.

## 1.2 Purpose of the Report

This report sets out in three sections the WG-ID response to the requests made by the Expert Group in June. A final section draws the recommendations together.

### Measuring the implementation of ICZM

A number of road tests have been carried out by ICZM practitioners at various spatial levels. Further tests are planned at sub-national, national and regional seas levels. As a consequence of the tests undertaken so far, the indicator has been extensively redrafted.

It is clear from the fieldwork, however, that there is no right way or wrong way to complete the questionnaire. Perhaps the greatest value of the indicator for MS in the lead-up to their national strategies, is its usefulness in bringing together different interests, experiences and competences to complete the questionnaire and in so doing, to debate the extent to which ICZM is being practised from differing sectoral and spatial perspectives.

*The WG-ID recommends that MS use the indicator as it is at present as a way of engaging coastal stakeholders at all spatial levels in a debate about the progress of the implementation of ICZM and thus of establishing a baseline against which further progress can be measured in the coming years.*

### **Indicators of sustainable development of the coastal zone**

The sustainability indicators have been chosen on the basis that they satisfy certain recognised criteria for indicators, that they are suitable for assessing whether the seven goals for the coast laid down by the EU ICZM Recommendation are being met, that they are compatible as far as possible with existing data, and that they are responsive to the needs of the MS in developing their national strategies.

Only one country to date - Belgium - has chosen a set of indicators of sustainable development for its coast, agreed the units of measurement, compiled the data necessary and begun reporting the results.

The WG-ID proposes collecting data on 27 indicators. Apart from Belgium, the most that any one country measures and reports at present is 6. In informational terms, the European coast is virtually invisible.

Yet a significant amount of the data required to complete the proposed WG-ID indicators is collected already by the MS, sometimes at a national level but more often at NUTS 3, NUTS 4 and NUTS 5. It is estimated that 17 or 18 of the proposed 27 indicators could be compiled for at least three quarters of the 20 coastal MS using data that they themselves already collect, or is collected by international organisations.

What is required is that the European Union and Member States (and Candidate Countries) treat the coastal zone as a special and separate entity and adapt existing data accordingly.

Three indicator fact sheets are appended to chapter 3. They are based on the house style of the European Environment Agency. It is proposed that a similar fact sheet becomes the 'industry standard' for all European, national and regional coastal indicator sets.

*The WG-ID proposes that MS adopt the set of 27 indicators suggested and, supported by the ETC-TE, work with each other and the European Commission in developing a harmonised procedure of data collection, transformation and interpretation which will provide the information necessary to draw up national state of the coast reports in 2006 as well as a way of evaluating progress in sustainable development in succeeding years.*

### **Taking the indicators work forward**

Although certain Member States are compiling some of the indicators of sustainable development proposed by the WG-ID, as well as a small number of others pertinent to coastal issues, the task of drawing up a benchmark ahead of the roll-out of national strategies after 2006 must appear daunting. The WG-ID has therefore considered how the work necessary in compiling the indicators could be shared and thus the burden on individual countries lessened. Three suggestions are made.

*MS are recommended to support an INTERREG IIIC bid for funding to put the work of the WG-ID on a firmer footing; to choose one or two indicators and pilot their compilation on behalf of other countries; and to seek to improve the flow of coastal and marine information between national experts and EIONET representatives.*

A significant number of indicators are expressed in spatial terms. Visualisation of the indicators in mapped form is a stimulating and informative way of presenting information and encouraging engagement in coastal issues by political interests and coastal communities.

It is recommended that Member States encourage the development of a harmonised geographical information system integrating and displaying spatial data at local, regional and national levels.

## **Section 2: An Indicator for Measuring Progress in the Implementation of ICZM**

### **2.1 Origin of the indicator**

Following the EU ICZM Recommendation, members of the Expert Group asked for a way of measuring how far ICZM has been implemented at national, regional and local levels.

Some research exercises in the past have attempted to measure penetration of ICZM by counting the number of ICZM initiatives in a particular region or country. Others have gone further quantitatively and attempted to measure the length of coast supposedly managed by an ICZM programme.

Both methods are useful in that they help identify who is doing what on the coast and are important building blocks in any stocktake of ICZM activity, but they do not say much about the *quality* of any initiative.

The Working Group on Indicators and Data approached the problem by looking at a number of research exercises undertaken over the past decade which generally concluded that the ICZM process is both stepped and cyclical. This means that, first, its implementation will be phased in over a given time period, and that, second, each turn of the management wheel over that period will repeat each phase but in greater depth and complexity.

The research community broadly agrees that there are five phases through which the ICZM process passes:

1. A basis for future ICZM activity is laid down.
2. A framework has been built within which ICZM activity can take place.
3. Vertical and horizontal integration exists between coastal stakeholders.
4. An efficient, integrative and participatory coastal management programme is in place.
5. ICZM is fully implemented.

This general description of the implementation process was elaborated notably by Olsen who in 1997 divided the five phases into 'priority actions' which helped flesh out the detail of what is likely to occur in each phase.

The WG-ID considers the five phases, each sub-divided by Olsen's actions, a suitable basis for the model presented in this section even though the group recognizes that a considerable number of permutations of phase and action is possible.

A number of additional actions has been added which will help Member States to see whether or not in developing their national strategies they are adhering to the ICZM principles laid down in the EU Recommendation. For example, the principle that a combination of existing instruments should be part of the ICZM toolbox is contained in action 6; working with natural processes is reflected in action 10; and so on.

### **2.2 Road testing the indicator**

The action points, and the description of each action, which appear in Table 1 below, have been refined further by a number of tests conducted principally by ICZM practitioners at all administrative levels in Spain, France and in the Southern North Sea area (including coastal planners and managers from Belgium, France, UK and Holland).

Each test – in which participants filled in Table 1 – helped to clarify the language used in the table and led to a shift in emphasis in the description of some of the actions or, in a couple of cases, to move the action from one phase to another.

What became clear from the road tests is that each person will complete the table differently according to their own perspective. It is apparent that local practitioners have restricted information about what, if anything, is happening at regional or national level, and *vice versa*. Even people working in the same organisation would often differ with their colleagues in assessing whether a particular action is or is not being implemented.

In practice, the very act of completing the table is an important step in helping to implement ICZM! The debate necessary to decide on an answer, even one as apparently simple as ‘yes’ or ‘no’, leads to an exchange of information and opinion about which organisations and agencies are doing what on the coast, and to what effect. The mechanism encourages concertation both horizontally and vertically.

*In the light of the road tests, the WG-ID recommends that all countries help organise and promote a workshop (or a number of regional workshops) which will bring stakeholders together to complete the table. Such a workshop, for example, is taking place in the UK in March as part of the stocktaking exercise proposed by the EU Recommendation. Members of the WG-ID would be happy to help MS and AC facilitate such a workshop, if necessary.*

### 2.3 Completing the table

Table 1 shows a completed table. Against each action a simple ‘yes’ or ‘no’ has been entered for three spatial levels: national, regional and local. But because we want to identify a trend through time, a layer of complexity is added at each level by asking respondents to consider the action in two time periods.

The table should be understood both vertically and horizontally. Vertical use will show how far along the ICZM cycle a given authority, agency or area has travelled. Progress vertically is cross-cut against the horizontal dimension which reveals the degree of integration between the three spatial levels.

It is likely that progress in implementing ICZM will be as uneven as Table 1 suggests. *Actions need not necessarily take place in sequence.* Indeed, it would be surprising if they did. Adapting legal instruments to deal with coastal issues (action 6), for example, might be easier to achieve than a comprehensive funding programme (action 5). Regular cross-border co-operation (action 18) could precede a formal state of the coast report (action 8). Authorities, Member States and regions will respond differently to varying pressures. Some will seize an opportunity, such as an oil spill or a planning application to build an offshore windfarm, and help push ICZM along; others will take a more procedural approach. The nature of ICZM suggests there will not be blocks of red and green but that the table will be more of a patchwork.

Practical experience suggests that during the first time period or cycle, pioneering authorities or regions might reach into phase 3 of the ICZM process but leave a number of red boxes in phases 1 and 2. During the second phase, they might complete those actions without going on to phase 4. Each turn of the management wheel will see an increasing number of green boxes. Those actions coloured green in previous cycles are likely to be of a greater complexity, richness and impact as each cycle passes. A persistence of red boxes will suggest a blockage in the system or a problem which will need to be resolved.

During the road tests, participants toyed with the notion of assigning scores to each action, rather than a ‘yes’ or ‘no’. For example, 5 would mean that an action is fully implemented whereas 1 would indicate

that it has been introduced but is in a weakened or fragmentary state. However, it was felt that an attempt to measure the quality of each action in this way complicated the situation without adding additional value to the outcome. The WG-ID hence recommends that the questionnaire is completed - at least for the first time - using the simple yes/no formula.

Finally, it is important to realise the ground-breaking nature of this indicator. Set alongside the indicators of sustainable development, it is a test of the hypothesis underpinning the EU Recommendation - that an ICZM process is a prerequisite of a more sustainable coast. Experience might show that some of the actions in the table are unnecessary or of little significance whereas others are critical to meeting agreed goals. It may also be the case that certain actions in one MS or region, or when undertaken by a particular authority, have a greater impact than do the same actions in different regions or when carried out by other authorities.

### **Section 3: Indicators of Sustainable Development of the Coastal Zone**

#### **3.1 Prologue**

*Indicators* are a special tool in the coastal management toolbox. They are a way – really the only way – in which countries, regions and local areas can assess whether they are moving further towards, or away from, a more sustainable future for their coast, and at what pace.

The set of indicators of sustainable development proposed by the WG-ID will enable the European Union, Member States and Candidate Countries to undertake a baseline audit of their coast and then evaluate, every few years or so, the effect that their coastal strategy is having on coastal sustainability.

#### **3.2 Choosing the Indicators**

There are many hundreds of indicators which measure, or claim to measure, different aspects of the coastal and marine environment. Some are commonly used, others are rarely seen. Many of those that have been suggested by different agencies, organisations or interest groups at various times do not seem yet to have been tested in practice.

The WG-ID set of indicators of sustainable development passed through four principal filters before its composition was finally decided:

1. Basic criteria for successful indicators.
2. Relevance to the goals laid out in the EU Recommendation.
3. Compatibility with existing indicator sets.
4. Responsiveness to needs of MS.

##### **3.2.1 Basic criteria**

The proposed set has had to meet certain basic criteria. These criteria have been derived largely from the experience of coastal and marine policymakers, ICZM practitioners and coastal planners and managers over the past decade.

Taken together, the indicators had to capture the essence and reflect the breadth of the debate about coastal issues.

More specifically, the indicators had to satisfy most, if not all, of the following criteria:

- to measure performance and the results of policies and actions;
- be both scientifically valid and politically defensible;
- be practical (in the sense that they are measurable and that data are available and can be captured, transformed and displayed in a relatively easy way);
- be capable of assessing conditions and trends;
- be easy to understand and useful for both practitioners and policy-makers as well as the general public;
- show connections between environmental, social and economic concerns;
- where appropriate, be capable of measurement at European, national, regional and local levels;
- be comparable from place to place.

### 3.2.2 Relevance to the goals

Indicators are used to measure progress along a path to a preferred destination. Sometimes that destination is expressed in visionary terms, sometimes more concretely as a number of goals.

The WG-ID indicators proposed here have been chosen in order to assess whether or not the seven goals specified in the EU ICZM Recommendation are being met:

- to control, as appropriate, further development of the undeveloped coast - *Chapter 1 (a), (f) & (h)*
- to protect, enhance and celebrate natural and cultural diversity - *Chapter 1 (a) & (e)*
- to promote and support a dynamic and sustainable coastal economy - *Chapter 1 (d) & (g)*
- to ensure that beaches are clean and that coastal waters are unpolluted - *Chapter 1 (a), (g) & (h)*
- to reduce social exclusion in coastal communities - *Chapter 1 (e) & (g)*
- to use natural resources wisely - *Chapter 1 (a)*
- to ensure appropriate and ecologically responsible coastal protection - *Chapter 1 (b) & (c)*

### 3.2.3 Compatibility with existing indicator sets

Assuming that indicators meet the basic criteria and that they are capable of assessing progress towards attaining the goals laid down in the EU Recommendation, a further factor in deciding on their inclusion in the WG-ID set is whether they are capable, in large part, of being measured by data collected already by the European Union, international organisations or MS themselves.

#### *Pan-European and regional seas users*

The WG-ID looked at a number of indicator sets compiled by the European Union, international organisations, diverse agencies, interest groups, NGOs and research institutes.

Column 5 in the accompanying table (Table 2) shows that 19 of the proposed 27 WG-ID indicators are measured already by pan-European, UN or regional seas users. However, few organisations collect data about more than a handful:

*United Nations Environment Programme Plan Bleu  
European Environment Agency*



<i>World Bank</i>	4
<i>EUROSTAT</i>	3
<i>Commission for Sustainable Development</i>	4
<i>Baltic 21</i>	3
<i>Convention on Biological Diversity</i>	3

It is also the case that international organisations, principally because of their remit, favour collecting *marine* rather than *coastal* data. The most popular indicators among the international organisations are:

<i>Fish stocks and fish landings</i>	8 (organisations)
<i>Concentration of nutrients in coastal waters</i>	7
<i>Area of land and sea protected by statute</i>	6
<i>Amount of oil pollution</i>	4

### **Member States**

Column 6 in Table 2 shows the results of the exercise repeated for the 20 coastal Member States. Much of the information which contributes to the sets of indicators published by pan-European and regional seas users is collected by countries. But only a few countries use those data in their national sets of indicators of sustainable development.

Among those MS which do include coastal data in their national indicator sets, it is likely that information about phenomena which countries are required to compile will feature most often:

	<i>No. of countries including coastal data in their national sustainability indicator sets</i>
<i>Quality of bathing water</i>	13
<i>Concentration of nutrients in coastal waters</i>	13
<i>Fish stocks and fish landings</i>	12
<i>Change in coastal habitats and species</i>	9
<i>Sea level rise</i>	5

However, an assessment of the data which is collected already by MS shows that a large number of the proposed WG-ID indicators *could* be produced using existing data. For example, not one country publishes information about the degree of social exclusion in the coastal zone, yet the data is apparently available at NUTS 4 or NUTS 5 in 15 countries for that to be done. Again, just three countries include an indicator about the intensity of tourism on the coast but a further 16 or so have the ability to do so from data collected routinely at present.

In other words, much of the data required to measure the proposed WG-ID indicators are already collected by most MS and can be displayed, where appropriate, at national, regional and local levels. To facilitate that process, the units of measurement chosen for the WG-ID set match as closely as possible the methodologies already used by MS (and the international organizations).

*What is required is that the European Union, and MS, treat the coastal zone as a special and separate entity and adapt existing data accordingly (as many do now for 'rural', 'mountain, and 'urban' areas). If that were done, the WG-ID estimates that as many as 18 of the proposed 27 indicators could be compiled for at least three quarters of MS using existing data (Column 8, Table 2).*

### 3.2.4 Responsiveness to MS and AC needs

The final filter through which the WG-ID indicators passed was a test of responsiveness to national, regional or local needs.

It is self-evident that the nature and intensity of pressures on the coast differs from place to place. For some regions, for example, intense demand for residential coastal land has led, *inter alia*, to the degradation of semi-natural habitat, an increase in litter and oil pollution, a rise in road traffic and the accompanying demand for new infrastructure, enhanced coastal defences, changes in the character of coastal towns, pressure on water resources, and so on. An indicator showing a year-on-year increase in the demand for coastal properties in such regions might be viewed with alarm and could lead to restrictions on further development. But the same trend in a remote area could be seen in a favourable light and as evidence that policies designed to halt and reverse depopulation have been vindicated! *In other words, the indicators in the WG-ID set can be (indeed, must be) interpreted in the light of the experience of the country or region in question and in accordance with national or local targets and goals. It is also the case that not all MS will be equally interested in pursuing all of the indicators, and certainly not at all spatial levels. Again, it may be that there are particular 'hot spots' on which Member States or regions or local areas would want to concentrate. The WG-ID considers the proposed set to be flexible enough for either MS or regions to add their own indicators or additional measurements to reflect local circumstances.*

### 3.3 Displaying the Indicators

It was noted above that a significant amount of the data needed to develop the indicators is already available in MS and AC. What is needed is a set of guidelines to help the European Union, countries and regions extract the relevant material from the available data.

The WG-ID was asked by the EU Expert Group to show the development of a few indicators. Three varying examples based on EEA and EUROSTAT house styles have been appended to this report:

- Annex 1: Percent of built-up land x distance from the coastline
- Annex 2: Rate of development of previously undeveloped land
- Annex 3: Quality of bathing water.

*It is proposed that the fact sheet model used here becomes the 'industry standard' for all European, national and regional indicator sets.*

A significant number of indicators are expressed in spatial terms. Visualisation of the indicators in mapped form is a stimulating and informative way of presenting information and encouraging engagement in coastal issues by political interests and coastal communities. But comparative mapping, especially across regional and international boundaries, is bedevilled by incompatible systems, protocols and methodologies.

*It is recommended that Member States encourage the development of a harmonised geographical information system integrating and displaying spatial data at local, regional and national levels.*

## Section 4: Taking the indicators work forward

### 4.1 Support for Member States

The WG-ID has been considering how best to help MS put in place the baseline data necessary to benchmark the national strategies as they roll out after 2006. The group has three suggestions as to how this could be done:

1. Each country is invited to choose one or two indicators from the proposed set and investigate whether data are available and in what form, how they are collated, transformed, interpreted and disseminated. Working to a common format, each MS would present its findings as a national fact sheet. The WG-ID would then help other countries check out whether the methodology could be applied to their situation. In this way, the amount of work involved in compiling national indicators would be considerably lessened.
2. At present, the work of the WG-ID is on an ad hoc footing. In order to make a more permanent resource available to help MS implement the set of indicators, a bid for funding to the INTERREG IIC Community Initiative Programme by a transnational partnership of regions led by Catalunya (ES) would be taken forward in 2004. If the bid is successful, the partnership would work collectively on producing fact sheets for a number of indicators which MS could use as they are, or adapt to their particular circumstances.
3. The ETC-TE will report in late 2004 on an indicative European state of the coast report. Information from this exercise will be available to MS through EIONET to help countries set their national data in a wider context. At the very least, members of the EU Expert Group will want to liaise with their EIONET representatives to ensure an unobstructed flow of information.

#### **4.2 A common spatial framework**

The EU Demonstration Program on ICZM showed the importance of a common spatial framework for the coast so that local information systems could be included in a more general regional and national infrastructure. The Thematic Experts report noted particularly the frustration felt by end users wishing to display mapped information which crossed regional and national boundaries, or regional seas, but who were unable to do so because of incompatible data systems, protocols or projections.<sup>(1)</sup>

The EU ICZM Recommendation calls on Member States to “include adequate systems of monitoring and dissemination of information to the public about their coastal zones. These systems should collect and provide information in appropriate and comparable format to decision makers at national, regional and local levels to facilitate integrated management”.

Since the ICZM Recommendation was approved, other policy initiatives have emphasised the importance of developing common systems of monitoring, storing, displaying and disseminating coastal data. The Urban Strategy, the Maritime Strategy and the emerging Marine Thematic Strategy will benefit from the ability to map coastal zones and regional and sub-regional seas on a common basis. And by its very nature, the Water Framework Directive will demand that information is displayed and publicised across administrative and national boundaries.

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1. Bridge L, Doody JP, Gilbert CR and Pamplin C (1999). *Nature of Information Required for ICZM*. European Commission. Brussels.

In fulfilling their obligations to take forward these and other strategic initiatives, Member States would be greatly advantaged if a common geographical information system (GIS) infrastructure for the European littoral was in place. The European Environment and Spatial Information System (EESIS) being pursued by the European Environment Agency would appear to offer a suitable parent platform for such a GIS

infrastructure. In fact, the EEA is keen to road test EESIS through 2004 using coastal data. If successful, the pilot will help kick-start the harmonised GIS that coastal planners and managers have been seeking for some time.

*Member States are encouraged to support the initiative where appropriate and encourage the steps being taken towards greater harmonisation of spatial data.*

## **Section 5: Summary of Recommendations**

The Working Group on Indicators and Data recommends that coastal Member States and Candidate Countries (and the EU, where appropriate):

1. Adopt the indicator to measure progress in the implementation of ICZM in order to establish a benchmark against which further progress can be measured in succeeding years.
2. Convene a workshop (or a number of regional workshops) to road test and refine the progress indicator as one way of engaging coastal stakeholders, end users and coastal communities in the development of national and regional ICZM strategies.
3. Adopt the proposed set of 27 indicators of sustainable development of the coastal zone so that the EU, MS and regional authorities can assess whether we are moving further towards, or away from, a more sustainable future for the coast, and at what pace.
4. Endorse the fact sheet model as the 'industry standard' for all European, national and regional indicator sets.
5. Choose one or two indicators from the proposed set and work them up on behalf of all other countries.
6. Support, as appropriate, an application on behalf of the WG-ID for funding the development of a transnational indicators project.
7. Encourage steps being taken towards the harmonisation of spatial data in general and the EESIS initiative in particular.