INFORMATION SYSTEMS & INTEGRATION TOOLS

factsheet

Bite-sized introductions to Sustainable Development themes

SMAP III Technical Assistance
www.smap.eu

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ERM

WHAT ?

The coastal zone is a difficult area to manage due to many competing needs that exist within a complex and dynamic natural, social, economic systems as well as within an equally complex setting of jurisdictions and legal mandates. Remits of government agencies often lead to a situation where the act of one directly impinges on others. For any issue, information is required from all sciences, and legal and institutional backgrounds to address five different dimensions of integration:

(i) between sectors;

(ii) between levels of government

(iii) between administrative boundaries so that management is cooperative and coordinated,

(iv) across the land-water interface

(v) between disciplines so decisions are made from all available information so that a holistic assessment and evaluation is made.

An Information System to support this goal is one that makes information available to support the administration of environment, resources and planning tasks. Integration Tools are methods that bring together information from multiple sources to provide a holistic picture of the coastal setting and upon which decisions are made.

WHY ?

Management is more than just acquisition of data for making decisions. Data needs context to become useful information that can be integrated to provide a holistic understanding of coupled human-environment systems. An Information System supports a more effective approach based on distributed systems and group decision-making.

The concept of integration is not new and has been applied in other environmental settings to overcome "surprises" from sectoral approaches that result in unplanned impacts and consequences. Integration Tools are not focused on acquisition of primary data but on the retrieval and access to information from distributed sources within the framework of ICZM to provide a "joined-up" analysis. The outcome of integration is creation and application of new knowledge derived from a broad spectrum of disciplines and sectors to arrive at new innovative solutions to coastal issues.

WHEN ?

Information is required to support all stages of the management of coastal issues and a system to support the whole process has a number of elements:

A. **Generic:** Base-layer information from all disciplines that give other data meaning in terms of their location, ownership and responsibility.

B. **Base:** Task-Specific information of, for instance, land-use and shoreline change, socio-economic survey data relevant to the coast.

C. **Integrating:** Parts of the system which draw together base, generic and contextual information in order to enable analysis for the purposes of management.

D. **Organising:** Technologies needed to inter-operate and connect different parts of the system.

E. **Information Service:** highly synthesised information including indicator sets and tools that aim to provide an overview of strategic information to decision-makers.

Integration tools are primarily concerned with taking outputs from the Information System and bringing them together as outcomes that describe a future scenario that can be used to inform decision making.

WHO ?

To develop a process of ICZM, it is necessary to work and coordinate with the organisations and institutions of all information providers, decision and policy makers and stakeholders to identify coastal issues and problems and identify the gaps that prevent the immediate formulation of solutions. The construction of and Information System and use of Integration Tools is a means to bring together the appropriate mix of people to achieve integrated management of the coastal zone:

- The scientific community and other information providers who provide measurements of events or phenomena. They need to be able to use their results to suggest and advise on the identification and use of indicators that can be utilised by non-experts to assess, evaluate and monitor specific problems or applications.

- The policy makers, decision makers and coastal managers who use information to work within existing legal mechanisms, or create new ones (that employ principles such as Precautionary principle, preventive action, polluter pays, rational and equitable resource use, and public involvement) in order to address coastal issues and problems.
- Other stakeholders (NGOs and civil society) who have an influence and/or interest in coastal issues and hold relevant information (data, perspectives) pertinent to the issue.

HOW ?

The key on-going challenge in relation to the nature of information and integration required for coastal zone management lies not in the provision or content of information itself, but in the way it is presented to those who formulate and implement policy and take management decisions. Contributing disciplines must provide more than just information on the state of the coastal environment, identifying indicators for assessing environmental change and/or developing mechanisms for monitoring and predicting the effect of policy and management options. Information systems must also inform the analysis of issues, help the user to ask the right questions and then provide signposts to where appropriate data can be found. Often three forms of tools for integration are identified:

(1) *Systems integration* ensures that social, economic and environmental (bio-physical) aspects of all relevant interactions and issues are identified. Tools inform the analysis of issues by interpreting information in the context of what it means. Tools to answer the "so what" question include:

- Stakeholder Analysis to identify actors, their relationships to each other and economic interests, as well as their perspectives on coastal issues.
- Problem and Situational Analysis to interpret what individual disciplines can tell about the coast to help understand the negative aspects of an existing situation, the underlying problems and causes, how to identify and implement solutions. This helps break the coastal issue into component parts suitable for analysis using tools such as the DPSIR framework.

(2) *Functional integration* focuses on ensuring that management interventions are consistent with management goals and objectives and do not counteract each other:

- Objective analysis is a methodological approach employed to (i) describe the situation in the future once identified problems have been remedied; (ii) verify the hierarchy of objectives; and (iii) illustrate the means-ends relationships necessary for solutions to be achieved.
- Strategy analysis identifies different approaches to achieve solutions and selecting the most appropriate strategy to achieve meeting goals and aims of projects.

(3) *Policy integration* concerns the need to incorporate management procedures with development policies, strategies and plans.

- Institutional Analysis leads to understanding of how a resource is managed both in terms of the people involved and the law and policy frameworks within which they have to work.
- Gap Analysis identifies both knowledge gaps that prevent the formulation of solutions and also gaps in capacity and capability in implementing authorities to execute solutions.

Computer based "Decision Support" systems" (DSS) have been developed with the intent to make scientific knowledge about complex systems more accessible "horizontally" between disciplines/sectors and "vertically" from data providers to managers and decision makers. At early stages of development the importance of a tool that facilitates discussion and brings together stakeholders with different objectives should not be overlooked.

A balanced management perspective is needed in which inter-sectoral relationships are fully understood, trade-offs recognized and anticipated, benefits and alternatives assessed, appropriate management interventions identified and implemented, and necessary institutional and organizational arrangements worked out.

WHERE ?

A lack of integration is one reason why the SMAP project came into being and recently the Plan Bleu has evolved to incorporate and address the challenges of integration.

SD LINKS

Integration is linked to other forms of strategic development such as Agenda 21, spatial planning, SEA and EIA, international and regional conventions.

FURTHER READING

http://www.fao.org/docrep/W8440E/W8440e00.HTM
http://www.netcoast.nl/coastlearn/website/intro/index.html
http://www.iasonnet.gr/abstracts/prem.html
http://www.pap-thecoastcentre.org/index.php?lang=en
http://www.planbleu.org/indexUK.html