Mission to implement the course module on integrated coastal zone management.

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Report of Mission No. 2007-…

Mission to implement the course module on integrated coastal zone management.

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Wageningen
The Netherlands
March 2007

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1 Introduction

From 8 to 22 February 2007, Ir. Henk Ritzema of Alterra-ILRI, Wageningen University and Research Centre, The Netherlands, visited the Water and Environment Centre (WEC) of Sana'a University to assist the staff with the implementation of the 8-week module "Integrated Coastal Zone Management".

The terms of reference for the mission were:

- To support the WEC staff with the implementation of the module on ICZM;
- To teach the subject "Management Strategies and instruments";
- To assist and participate in the excursion to Aden;
- To recommend on the module contents and schedule.

The program of the mission and the persons met during the mission are presented in Appendix 1.

This report presents the findings of the mission. The report has been written in close collaboration with the WEC Project Staff. The author wishes to express his sincere gratitude for the hospitality and co-operation of the WEC staff, in particular Dr. Naif Abu-Lohom, the course coordinator and Dr. Richard Soppe, the project coordinator. The excursion to Aden, including the discussions with the local authorities, the students and the WEC staff, significantly contributed to enhance the course module on ICZM.

2 Lectures "Management Strategies and Instruments"

For theme 4 "Sustainable development of coastal zones in Yemen" of the course module on ICZM, a workbook (Appendix 2) and a PowerPoint presentation (Appendix 3) were prepared for the series of lectures "Management strategies and instruments". A summary of the workbook is presented in Box 1. The lectures, including a number of assignments, were given in the period Saturday 10 February to Thursday 15 February. Eleven students followed the lectures.

Box 1 Summary of the lectures "Management strategies and instruments"

Course	MSc Programme on Integrated Water Resource Management	
Module	Integrated Coastal Zone Management	
Subject	Management strategies and instruments	
Lecturer	Ir. Henk Ritzema, Alterra-ILRI, Wageningen University and Research Centre, Wageningen, The Netherlands	
Study load	Lectures Assignments	8 hours 8 hours
Lecture notes	This handbook and selected literature	
Learning method	• Lectures • Group assignments • Self-study	
Learning Objectives	*Knowledge*	Understand which management strategies and instruments can be used for the sustainable development of coastal zones in Yemen
	Skills	Application of this knowledge in the group assignment leading to a (discussion paper) on the role of IWRM in ICZM in Yemen
	Attitude	Awareness that ICZM is a complex process which needs a careful and flexible approach.
Brief description of subject	The management strategies and instruments for integrated coastal zone management will be introduced. Coastal zone management is a complex process in which many stakeholders, often with conflicting interests, are involved. ICZM is a tool to create a mechanism for sustainable development of the coastal resources. This tool consists of a strategy and (master) plan for implementation, including environmental impact	

	assessments to sustain development. The approach should be flexible as needs and functions are changing in time. The process to develop a management strategy and the instruments to implement this strategy involves a number of steps, i.e. preliminary investigations to define the problem(s) and needs; data collection; data analysis; dialogue with the stakeholders; followed by negotiations / consultations; writing the draft strategy and finalizing it. This is an iterative process, to optimize the outcomes it has to be repeated a number of times. Special attention will be on the challenges to make the development process more sustainable.
Contents	• Towards a strategy for integrated coastal zone management. • Factors affecting the planning process of integrated coastal zone management. • Implementation instruments and methods for integrated coastal zone management. • Environmental impact assessments for integrated coastal zone management.

Based on this series of lectures, a number of questions were prepared for the final examination of the module on ICZM (Box 2). The course coordinator will select one or two of these questions for the actual examination.

Box 2 IWRM MSc Programme – Module on ICZM – Questions for the examination

1. Describe the three steps in the development of an Integrated Coastal Zone programme.
2. Explain why the development of an ICZM programme is an iterative process.
3. Describe some of the constraints in using Environmental Impact Assessments for ICZM practices.
4. Mention and explain sustainability criteria/principles that should be applied for the re-use of waste water.
5. What management tools are available to implement an ICZM program?
6. During which steps in the development of an ICZM programme do you want stakeholder participation? What instruments are there available to increase this stakeholder's participation?

3 Excursion to Aden

3.1 Programme

In the week 16 to 21 February an excursion to Aden was organised, during which a number of organisations involved in ICZM were visited. The excursion programme is presented in Box 3 and the locations and organizations visited during the excursion are briefly introduced in the following paragraphs. More information can be found in the reports prepared by the students as part of their assignments for this module.

Box 3 ICZM Excursion to Aden	
Friday 16 February	Travel to Aden, stops at: • Dhamar Plain – groundwater extraction for agriculture • Yarim – water treatment plant • Damt – Volcano • Billa Wadi – shallow wells for a.o. car washing
Saturday 17 February	• Al-Heswah wetland: eco-tourism development • Al Manssora Waste Water Treatment Plant • Bird Watch Centre, Aden Causeway • Environmental Protection Authority, Aden: Aden Coastal Zone Management Programme
Sunday 18 February	• Fuqun and Amran fisheries cooperative • Marine Science Research Centre of the Ministry of Fisheries Wealth, Aden
Monday 19 February	• Environmental Protection Agency, Aden: Watershed catchments in Aden • Visit Tawilah and Khusaf Watershed catchment, Aden Crater
Tuesday 20 February	• Al-Heswa Thermo-electricity and Desalination Plant • Aden Governorate • National Water Resources Authority, Aden Branch
Wednesday 21 February	Travel to Sana'a

3.2 Al-Heswah wetland

Al-Heswah wetland (about 185 ha) is a fresh/brackish water wetland at the downstream part of Wadi Alkabir along north shore of the Bay of Aden, near Al Manssora. Since times immemorial, the Al-Heswah wetland is used by the local population (about 70 households) to collect fruit, rosin (for liquor) and palm leaves (for baskets), to graze their cattle, etc. The wetland is under treat: at the eastern site, the Free Port Zone wants to include the wetland in their industrial expansion and at the western site, the area was used as a refuse dump.

To protect the area, the land is now developed for eco-tourism: a bird-watching

look-out and exhibition platform is under construction, shrub trees are removed (to be replace by the indigenous palm trees), walking tracks and a children play ground are created. The area will also be fenced (using local available timber and palm leaves) to keep the cattle out. These activities are carried out in close cooperation and participation of the local population.

A guide tour was organised by Mr. Gamal Bawazir of the Marine Science Research Centre and the students discussed the possibilities of eco-tourism with the local stakeholders.

3.3 Al Manssora Wastewater Plant

Al Manssora wastewater treatment plant purifies the wastewater from the Al Manssora residential area. The plant consists of 5 basins in which the water is subsequently purified; the first basin has anaerobic treatment, the others aerobic. The plant, established in 1975, has a design capacity of 5 000 m^3/d, the treated effluent should have a BOD of 50 mg/l. At present, due to the increase in population, the plant handles on average 17 000 m^3/d. The in- and out-going water has the following quality:

		in	**out**
Volume	[m^3/d]	16 800	14 800
pH		7.4	8.3
T	[^{0}C]	32.0	29.1
DO	[mgl/]	0.03	1.57
TDS	[mg/l]	1 861	1 842
EC	[mg/l]	3 000	3 000
BOD	[mg/l]	660	175
T.Coliform		53 x 10^6	0.26 x 10^6
F. Coliform		28 x 10^6	0.09 x 10^6

The solid waste, about 2 000 m^3/y, is dried and distributed to farmers to be used as fertilizer. Part of the effluent is used by the municipality to irrigation roadsides and public parks.

3.4 Bird Watch Centre Aden Causeway

An NGO is operating a bird watch centre along the causeway to Aden. A platform has been created from which birds can be observed in the tidal mud flat of Aden: flamingos, pelicans and other waterfowls.

3.5 Environmental Protection Agency

During the visit to the Environmental Protection Agency, the ICZM plan for the greater

Aden region was presented and discussed. In the plan, twenty two user-functions have been identified (see Table) and thirteen locations for development have been identified. Seven criteria, derived from the user functions, are used to assess the development potential for each of these 13 locations.

User functions		
1. Historical sites	8. Desalination plant and fibreglass factory	15. Sea grass zones
2. Tourist projects	9. Fishing grounds	16. Turtle nesting beaches
3. Harbours	10. Public/private beaches	17. Birds
4. Fuel/bunker station	11. Roads and boulevards	18. Halophytes
5. Electricity plant	12. Dredging zones	19 Fresh-water wetlands/vegetation
6. Fishing villages	13. Sewage outfalls	20 Sandy & rock coast
7. Land fill sites	14. Coral reefs	21. Islands
		22. Sensitive areas

3.6 Fuqun and Amran Fisheries Cooperative

The Fuqun and Amran fish cooperative has around 1500 members. The cooperative runs an ice factory, cold storage facilities and a jetty for its members. The chairman briefed the group on the history of cooperatives and the students met members which whom they discussed the current constraints and benefits of cooperatives.

3.7 Marine Science Research Centre

The Marine Science Research Centre, established in 1983 as part of the Ministry of Fish Wealth, conducted research on the marine environment in the coastal zones of Yemen. The director and Mr. Gamal Bawazir briefed the group on the research conducted by the Centre. These research activities are hampered by lack of funding.

3.8 Tawilah and Khusaf Ancient Cistern

Dr. Adel Alhababy of the Yemen Geological Society presented a lecture on the geology and watershed harvesting practices in the Aden Crater area and organised a guided tour to the Tawilah and Khusaf Cistern. The Yemeni Geological Society (YGS) is a scientific NGO, established in 1992 to promote the geological knowledge among the community in order to attract positive attitude regarding various aspects related to mineral resources development and ecological problems. In the greater Aden Crater area, the YGS has studied the ancient water harvesting practices and promotes the rehabilitation and convervation of these ancient

systems. The Tawilah and Khusaf cisterns, which were constructed in ancient times, intercept and store runoff from the high hills around the crater. Thirteen of these ancient basins were rehabilitated in the 1850s. These basins, with a total volume of 20 million imperial gallons, are still operational.

3.9 Al-Heswa Thermo-electricity and Desalination Plant

The Al-Heswa Thermo-electricity plant, established in 1981, has 6 boilers that produce 125 MW of electricity, of which 15 MW is used in the plant. As a by-product, fresh water is produced in a desalination plant at a rate of 580m^3/hr and a costs of YER 500/m^3. The cost of production, however, by far exceeds the cost of utilizing the groundwater that the municipality of Aden extracts from he Wadi Tuban well-field for a price of around YER 50/m^3. Thus even at a subsidized price of YER 175/m^3 the desalinized water is hard to sell.

3.10 Aden Governorate

During a visit to the Aden Governorate, the political dimensions, including the cooperation and coordination between the numerous stakeholder organisations, of the ICZM plan for greater Aden region were discussed with Eng. Waheed Ali A. Rasheed, Deputy of Aden Governorate, Aden.

3.11 National Water Resources Authority, Aden Branch

During a visit to the National Water Resources Authority, Aden Branch, the implications of ICZM planning in relation to National water resource planning were discussed with Eng. Abdulaziz Mahyoub Moh'd, Aden Branch Manager of the National Water Resources Authority.

4 Conclusions and follow-up

During the mission, the implementation course module "*Integrated Coastal Zone Management*" was discussed with, among others, Dr. Naif Abu-Lohom, the module coordinator, Dr. Khaled Al-Hariri, external lecturer and organiser of the excursion to Aden, and the students. Although the module still has to be evaluated in more detail, already a number of recommendations can be made:

1. The second semester of the MSC course IWRM includes a number of subjects that focus on integration, i.e. Water chain management (WCM), Integrated groundwater management (IGWM) and Integrated coastal zone management (ICZM). Subsequently, there is quite some overlap in the subject matter presented in these modules. This is good as it exposes the students to integrated water management from various viewpoints/disciplines, but there is a risk for confusing and contracting information. Thus there is a need for fine-tuning, i.e. the approaches, methodologies, terminology, etc., presented in the various modules should be consistent; the relation with IWRM should be enhanced in a consistent way, etc. It is proposed to discuss this issue in a workshop in which the module coordinators and (preferable) the advisors from The Netherlands participate.

2. The subject "*Management strategies and instruments*" discusses, among others, the approach for integrated coastal zone management. For practical reasons, i.e. to give the consultant the opportunity to lecture as well to participate in the excursion, this series of lectures was scheduled at the end of the module. The students have suggested that these lectures should be scheduled at the beginning of the module. An idea that is endorsed by the consultant.

3. For practical reasons, the excursion concentrated on the greater Aden region and the Red Sea Coast, which was originally included, was left out. Although the excursion to Aden was very interested and showed many, often conflicting, aspects of ICZM, the focus was, not surprisingly, on ICZM in an urbanized area and aspects related to rural areas, for example agricultural water use, were not treated in detail. As most coastal regions of Yemen have a more rural character compared to Aden region, it is proposed to include the Red Sea Coast in future excursions.

4. To complete the module on ICZM the students have to prepare a (discussion) paper on the role of IWRM in ICZM in a selected coastal region in Yemen. Next to this assignment, the students also have to prepare a report on the excursion to Aden. To value these activities it is proposed to rate the final mark for the module as follows:
    - Written examination (individual) 60%
    - Excursion Report (group work) 10%
    - Discussion paper (group work) 30%

Appendix 1 Program and persons met during the mission

Program:

Day	**Activity**
Thursday 8 February	• Travel to Yemen
Friday 9 February	• Preparation lecture notes & PowerPoint presentation
Saturday 10 February	• Lectures at WEC, discussion with Dr. Naif Abu-Lohom, module coordinator
Sunday 11 February	• Lectures at WEC
Monday 12 February	• Lectures at WEC
Tuesday 13 February	• Lectures at WEC
Wednesday 14 February	• Preparation Workbook • Meeting First Secretary Water, Royal Netherlands Embassy
Thursday 15 February	• Lectures at WEC • Discussion with mid-term review mission
Friday 16 February	• Report writing
Saturday 17 February	Travel to Aden, with stops at • Dhamar Plain • Yarim - water treatment plant • Damt – Volcano • Billa Wadi – shallow wells
Sunday 18 February	• Al-Heswah wetland: eco-tourism development • Al Manssora Waste Water Treatment Plant • Bird Watch Centre, Aden Causeway • Environmental Protection Authority, Aden: Aden Coastal Zone Management Programme
Monday 19 February	• Fuqun and Amran fisheries cooperative • Marine Science Research Centre of the Ministry of Fisheries Wealth, Aden
Tuesday 20 February	• Environmental Protection Agency, Aden: Watershed catchments in Aden • Visit Tawilah and Khusaf Watershed catchment, Aden Crater • Evaluation of excursion with Dr. Khaled Al-Hairir and students
Wednesday 21 February	• Travel to Sana'a • Discussion with Dr. Naif Abu-Lohom • End-of-mission discussion with Dr. Abdulla Babaqi
Thursday 22 February	Departure

Persons met during the mission:

- Prof. Dr. Abdulla S. Babaqi, Director, Water & Environment Centre, Sana'a
- Dr. Naif Abu-Lohom, Course Coordinator, Water & Environment Centre, Sana'a
- Dr. Khaled I. Al-Hariri, Hariri & Associates, External Lecturer on ICZM, Aden
- Dr. Richard Soppe, Project Coordinator, WaterWatch, Sana'a
- Dr. Frans Huibers, Project Director, WU Irrigation and Water Engineering Group, Sana'a
- Ir. Bert Bruins, WU Irrigation and Water Engineering Group, Sana'a
- Ir. A.J.H. Negenman, First Secretary Water, Royal Netherlands Embassy, Sana'a
- Eng. Waheed Ali A. Rasheed, Deputy of Aden Governorate, Aden
- Eng. Abdulaziz Mahyoub Moh'd, Aden Branch Manager, National Water Resources Authority, Aden
- Gamal M. Bawazir, Marine Environmental Officer, Marine Science Research Centre, Aden
- Dr. Adel M. Alhababy, EcoSaba for Water & Environment Consultants, Aden

Appendix 2 Workbook "Managements Strategies and Instruments"

ALTERRA-ILRI

Republic of Yemen
Sana'a University
Water and Environment Centre

Water and Environment Centre, Sana'a University, Sana'a, Yemen
MSc Programme on Integrated Water Resource Management
Module on Integrated Coastal Zone Management

Management strategies and instruments
Workbook

Henk Ritzema

ALTERRA/ILRI
Wageningen University and Research Centre
Wageningen, The Netherlands
February 2007

SUMMARY

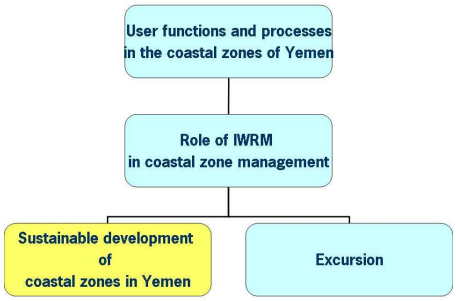
Course	MSc Programme on Integrated Water Resource Management
Module	Integrated Coastal Zone Management
Subject	Management strategies and instruments
Lecturer	Ir. Henk Ritzema, Alterra-ILRI, Wageningen University and Research Centre, Wageningen, The Netherlands
Study load	Lectures 6 hours Assignments 6 hours
Lecture notes	This handbook and selected literature
Learning method	• Lectures • Group assignments • Self-study •
Learning Objectives	*Knowledge* Understand which management strategies and instruments can be used for the sustainable development of coastal zones in Yemen *Skills* Application of this knowledge in the group assignment leading to a (discussion paper) on the role of IWRM in ICZM in Yemen *Attitude* Awareness that ICZM is a complex process which needs a careful and flexible approach.
Brief description of subject	The management strategies and instruments for integrated coastal zone management will be introduced. Coastal zone management is a complex process in which many stakeholders, often with conflicting interests, are involved. ICZM is a tool to create a mechanism for sustainable development of the coastal resources. This tool consists of a strategy and (master) plan for implementation, including environmental impact assessments to sustain development. The approach should be flexible as needs and functions are changing in time. The process to develop a management strategy and the instruments to implement this strategy involves a number of steps, i.e. preliminary investigations to define the problem(s) and needs; data collection; data analysis; dialogue with the stakeholders; followed by negotiations / consultations; writing the draft strategy and finalizing it. This is an iterative process, to optimize the outcomes it has to be repeated a number of times. Special attention will be on the challenges to make the development process more sustainable.
Contents	• Towards a strategy for integrated coastal zone management. • Factors affecting the planning process of integrated coastal zone management. • Implementation instruments and methods for integrated coastal zone management. • Environmental impact assessments for integrated coastal zone management.

Contents

1 Introduction

This series of lectures

The subject "*management strategies and instruments for a sustainable development of coastal zones*" is part of the Module "*Integrated Coastal Zone Management"* of the MSC Course "*Integrated Water Resource Management*". It addresses theme 4 of the module: sustainable development of coastal zones in Yemen.



In this series of lectures, the planning process of an integrated coastal zone management plan will be discussed. In Chapter 2 the planning process is briefly touched upon. In Chapter 3, the most important factors affecting this planning process are discussed. Followed in Chapter 4, with a discussion of the instruments and methods to implement a coastal zone management plan. Finally, in Chapter 5, to role Environmental Impact Assessments (EIA's) can play in a sustainable development of coastal areas is discussed.

Objectives

This series of lectures address the first and last two objectives of the module on ICZM, i.e. after the lectures course students should be able to:

- Know what the ICZM concept is about, what important ICZM issues in Yemen are and the role of the IWRM can play in the sustainable management of coastal zones in Yemen;
- Be able to identify the user functions, forces and processes in the coastal zones of Yemen and how they cause pressure on the natural system;
- Apply the principles of IWRM to sustain development in the coastal zones of Yemen;
- Know which information is needed in ICZM and how to obtain this information by monitoring and research programs

Purpose of this workbook

The purpose of this workbook is to guide the students through the relevant literature, mainly handbooks and papers on which these lectures are based. For each subject the relevant sections of these handbooks are indicated and, where necessary, specific points are highlighted.

Glossary For the definitions of the technical terms and expressions used in this workbook, a glossary has been prepared.

Questions To help you to understand the information presented in the literature, number of questions have been included. No answers are given, you should be able to find the answers in the literature.

Assignments Furthermore, a number of assignments have been included. The assignments are part of the overall assignment for this module, i.e. writing a discussion paper on the role of IWRM in ICZM in Yemen describing the opportunities and limitations for sustainable management for a specific sector (e.g. natural ecosystems, eco-tourism, fisheries or aquaculture, agriculture, etc). The assignments will be made in groups; each group will select one of the major coastal zones in Yemen, i.e.:

- *Tihama* Coastal Zone, between the Western Highlands and the sea from the international border with Saudi Arabia about 400 km towards the south. The Tihama Coastal Zone is the main agricultural region in the country, water supply for irrigation comes from spate and base flow and groundwater abstraction.

- *Tuban-Abyan Coastal Zone*, situated 250 km along the Gulf of Aden between the escarpment of the Southern Mountains and the sea from Bab Al Mandab in the west to Shuqrah in the east.

- *Ahwar-Maifa'ah* and *Al-Mukalla* Coastal Zones extend over 400 km along the Gulf of Aden from Al Kabr in the west to Qusayir between the escarpment of the Southern Mountains and the sea.

- *Al Ghaydah* Coastal Zone is in the extreme east of the country. This region is the most arid and remote parts of the country and receives limited and infrequent recharge.

Socotra. The Socotra archipelago is located in the north-western Indian Ocean, some 400 km south of the Arabian Peninsula. The archipelago consists of the main island of Socotra (3625km^2) and three smaller islands, Abd Al Kuri, Samha and Darsa. The archipelago is considered a special conservation area of high importance.

Follow-up After this series of lectures, a 1-week excursion will be organized to the coastal zones near Aden, where projects and organizations involved in coastal zone management will be visited. A special assignment that the students have to make during this excursion has been included in Chapter 6.

2 Towards a strategy for ICZM

🕮 Self study

- Babaqi (2006). Integrated Water Management – Introduction to IWRM
- Clark (1996): Chapter 1.5 Strategy planning, page 28-30
- GWP (2006): Toolbox (available on CD-Rom)
- Hinrichsen (1990), Chapter 12 The Red Sea and Gulf of Aden and Chapter 13 What Future for Regions Seas, page 159-168

Context

ICZM is a tool to create a mechanism for sustainable development of the coastal resources. In the chapter we will look how an ICZM programme is structured keeping in mind how we can apply the principles of IWRM to strengthen such a programme.

Example

Need for IWRM

According to Hinrichsen (1990) the Red Sea and Gulf of Aden are still relatively unspoiled, because development is hampered by the lack of fresh water. The main natural resources are:

- Coral reef, undamaged
- Mangroves, threatened by overgrazing by camels and goats
- Sea grasses, relatively healthy
- Metalliferous muds, despites huge research investments still not exploited
- Fishing grounds, still small-scale, artesian.

Pollution is still small, mainly from municipal and industrial waste, but potentially there are two threats: oil pollution from ships and mining of the metalliferous muds.

Question ?

To sustain future developments Hinrichsen recommends five measures. Which are these measures?

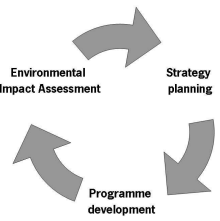
Regional cooperation

To pursue the sustainable development in the region, the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) was established in 1982. Since then many activities to study the status of the resources and to improve their management have been initiated, see for example PERSGA (2002).

ICZM programme has three elements:

- **Strategy**
- **Master plan**
- **EAI's**

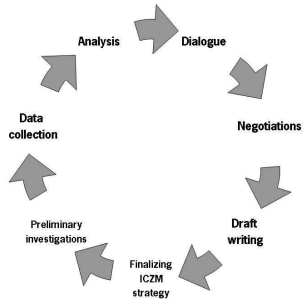
The development of an ICZM programme has three main elements: a strategy, (master) plan for implementation, and environmental impact assessments for the proposed activities/actions.



- The strategy planning is the process that explores options and develops an optimum strategy for a management program.
- The programme development results in a Master plan that defines options from human progress and recommends on governmental and private actions (sector plans)
- Environmental Impact assessments are used for prediction of a proposed project's effort on renewable coastal resources, biodiversity, and the quality of the human environment.

The development of a management strategy is a complex process in which many stakeholders, often conflicting interests, are involved. The process to develop a management strategy involves a number of steps, i.e. preliminary investigations to define the problem(s) and needs; data collection, including a review of policies; data analysis, including the formulation of (draft) goals and objectives; dialogue with the stakeholders; followed by negotiations / consultations; writing the draft strategy and finalizing it. This is an iterative process, to optimize the outcomes it has to be repeated a number of times.

Strategy planning is an iterative process



Complex process

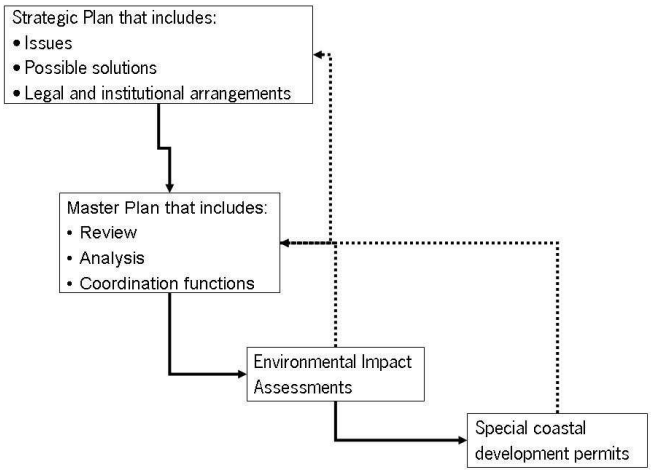
Developing an ICZM strategy is complex thus:

- Keep it simple
- Keep it politically and administrative viable
- Avoid unrealistic goals
- Avoid excessive complexity
- Provide a framework for coordination
- Keep it flexible

Remember

ICZM is a tool to create a mechanism for sustainable development of the coastal resources. An example of such a mechanism is given in the following figure:

ICZM is mechanism for sustainable development of the coastal resources



Be Flexible The approach should be flexible as needs and functions are changing in time.

Question?

- Mention three similarities between IWRM and ICZM?
- Mention three differences between IWRM and ICZM?

Assignment Use the GWP Toolbox to look up some ICZM planning activities in countries/regions with similar characteristics as Yemen

3 Factors affecting the planning process of ICZM

📖 Self study

- Clark (1996): Chapter 1.5 Strategy planning, page 28 – 51
- UNEP (1997): Chapter 3.5 – Yemen
- Zandri (2003): Saving Socotra – the treasure island of Yemen

Context

In this chapter, we will discuss the factors that affect the planning process of an ICZM plan. There are numerous factors, in this chapter they are only briefly touched upon. For a detailed explanation of these factors and their use, you should read specific literature on the subject or consult an expert in the particular field.

3.1 Setting

Definition of Coastal Zone

A general accepted definition of a coastal area is (International Commission on Irrigation and Drainage, Working Group on Sustainable Development): The region where the tidal processes are capable of affecting man's activity or of being influenced by man. This roughly extends tidal areas between the following limits:

- On the seaward side, up to the limit of conventional construction or dredging activity (typically of the order of 30m water depth);
- On the landward side, up to the limit of the action of the sea, including all those areas that might be subject to flooding by seawater and up all estuaries and rivers to the tidal limit (the point where water levels are no longer influenced by tidal propagation).

Question ?

What is the definition of the coastal zone in Yemen?

Non-physical boundaries

Defining the physical boundaries is not enough, the setting has other dimensions. Ask yourself questions like:

- Is the emphasis national or regional?
- Who are the expected beneficiaries of the ICZM program, both social and economical?
- Can these beneficiaries fund the ICZM program?
- Who are the major proponents and opponents of the proposed ICZM programme?
- What are the natural hazards and how can an ICZM program help to overcome these hazards?

3.2 Objectives

Objectives

Next, you have to define the objectives that have to be addresses in the strategy. Examples of objectives are:

- Maintain a high quality coastal environment

- Protect species diversity
- Conserve critical habitats
- Enhance critical ecological processes
- Control pollution
- Identify critical lands
- Identify land for development
- Protect against natural hazards
- Restore damaged ecosystems
- Encourage participation
- Provide planning guidance
- Provide development guidance

The first objective is very broad; it is an example of an overall objective. The other examples are specifying the overall objectives for a specific issue, user function or activity; these are so-called specific objectives.

Group Assignment

i) List the overall and specific objectives for your region your group has selected.

ii) Are there conflicting objectives?

3.3 Data collection

Data collection can be a costly and time-consuming effort, thus start with collecting existing data and make sure that the data you are looking for should:

- Enhance the decision-making process
- Clearly depict the trade-offs between the present situation and an integrated approach
- Lead to the clearest and least ambiguous set of objectives and/or mandates for the implementing agency.

Example

Examples of data collection are:

- Users of coastal areas and resources
- Coastal renewable resources
- Environmental impacts
- Upland effects
- Socio-economic effects
- Critical habitats
- Critical species
- Resource problems, issues and conflicts
- Natural hazards
- Natural reserves

Question ?

In a study conducted by UNEP (1997) an assessment of the main sources of pollution has been made. What are the user functions causing these pollution problems?

Example

Data requirements for drinking water supply

Example – Data requirements for drinking water supply
By analysing the various aspects of a user function, you can specify the data requirements. Let's take as an example drinking water supply.

User function: drinking water supply

Resource: which resources are used to get drinking water?

- Surface water: through dams water is diverted from a river.
- Groundwater: through wells groundwater is extracted from an aquifer.
- Sea water: through desalinization water extracted from the sea.

Note: this is only the first rough analysis. A second analysis will go into more detail: what type of river, what type of aquifer, etc.

Are these resources renewable?:

- Surface water: to a limited extend: rivers are fed by rainfall, which off course is renewable, but there is a maximum, depending on the rainfall and storage capacity behind the dam(s).
- Groundwater: to a limited extend: groundwater is also recharged by infiltrating rainfall, but there is a maximum, depending on the infiltration and transmitting capacity of the aquifer. Furthermore, and if too much groundwater is extracted salt-water intrusion will occur and the aquifer will be spoilt. through wells groundwater is extracted from an aquifer.
- Sea water: in principal unlimited.

Environmental impacts:

- Surface water: downstream less discharge in the river ➔ drier conditions, salt-water intrusion, etc.
- Groundwater: lower groundwater tables ➔ less capillary rise, less recharge to downstream aquifers ➔ salt-water intrusion.
- Sea: disposal of brine

Upland effects:

- Surface water: indirect, the dam can have some upstream effects: e.g. waterlogging, weed growth, etc.
- Groundwater: lower groundwater levels
- Sea: none

Socio-economic effects:

- Surface water: drinking water is not the only users, other users are: agriculture, industry (process water), downstream (nature) areas, etc. Thus the competition for the water will increase.
- Groundwater: idem ditto.
- Sea: disposal of brine can affect fishing ground, aqua-culture, nature areas, etc.

Critical habitats & critical species:

- Surface water: downstream area will be depleted this certainly affects critical habitats and species.
- Groundwater: less recharge downstream areas ➔ drier conditions
- Sea: disposal of brine can affect coral reefs, fishing ground, seagrass areas, etc.

Resource problems, issues and conflicts:

- Surface water: water conflicts between users
- Groundwater: water conflicts between users
- Sea: pollution conflicts

Natural hazards:

- Surface water: floods in the river, earthquakes can disturb the availability of water
- Groundwater: negligible
- Sea: storms can effect the intake

By analysis the specific needs for a user function in this way, you can better specify the data requirements. Depending on the objective/goal, this process can be repeated to further specify the data requirements.

Group Assignment

Above some examples for data that have to be collected have been presented. Try to specify these examples for your region.

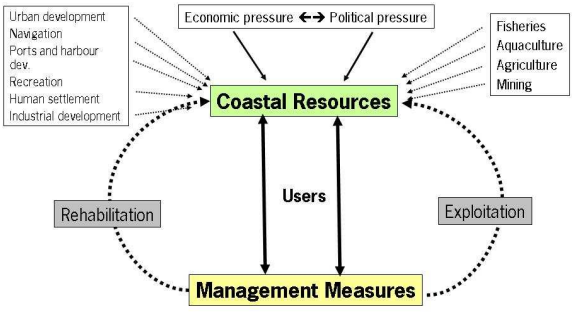
Group Assignment

i) List the land and water resources requirements for all the user functions.
ii) Are theses user functions conflicting?

3.4 Integration

Pressure from all sides

To define the management measures is a complex process as many different stakeholders are involved; each stakeholder uses the resources on his/her own way. All these users put pressure on the coastal resources. On top of these user-specific pressures, there will be political and economic pressure for development. The management measures should, for all users, address the exploitation and rehabilitation of these resources in order to develop them in a sustainable way.



3.5 Coordination

Coordination is a must

As many stakeholders are involved in the development of an ICZM strategy, this strategy has to provide a framework for coordination. There will be always proponents and opponents of the proposed ICZM programme and if there is no coordination the dialogue and/or negotiations between the stakeholders will no materialize and the implementation of the proposed ICZM programme is likely to fail.

3.6 Institutional arrangements

ICZM requires involvement of all levels of government, i.e.:

- Local
- Provincial/district
- National/central

Sometimes, special institutional arrangements are made; in Yemen, for example, the Socotra Conservation Fund has been created for the Socotra Archipelago.

Example

Socotra Conservation Fund
The Socotra Archipelago, a group of island in the Indian Ocean east of the Horn of Africa and owned by Yemen, is considered a special conservation area of high global importance (Zandri, 2003). To support conservation and sustainable development, the Socotra Conservation Fund (SCF) was established in 2002. SCF is a flexible, democratic and participatory organisation, owned and controlled by the membership through the General Assembly. The General Assembly is composed of eligible individuals and representatives of properly constituted, non-statutory organisations and community groups. A Management Committee, drawn from the General Assembly, administrators the organisation's activities. A non-voting Advisory Membership is open to other interested support organisations, including relevant statutory agencies and corporate bodies. The SCF was initiated by a partnership between the Environmental Protection Authority of YEMEN (EPA) and the United Nations Development Programme through its Global Environment Facility with support of the Governments of the Netherlands, Italy and Poland. For more information see: www.socotraisland.org

Question ?

Why requires ICZM involvement of all government levels, even when you are only considering a regional ICZM plan?

Group assignment

i) List all government agencies involved in ICZM and describe their functions/roles.

ii) Are they in line with each other or is there overlap, point of conflict?

Remember !!

The ICZM should be mandated ➔ Legislation is needed !!!

3.7 Incremental approach

Step by step

Developing an ICZM strategy is complex process; numerous stakeholders are involved; it should be flexible (do you remember why?), thus it is advisable to follow an incremental approach. Depending on the problems and needs, one or a combination of the following approaches can be selected:

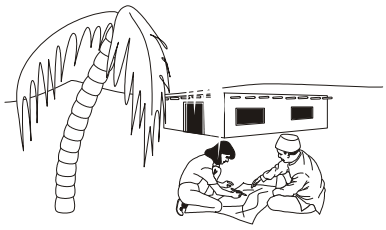
- Year by year
- Function by function
- Resource by resource
- Issue by issue
- Region by region

Group Assignment

For your region, describe how ICZM is done at present and whether an incremental approach is used?

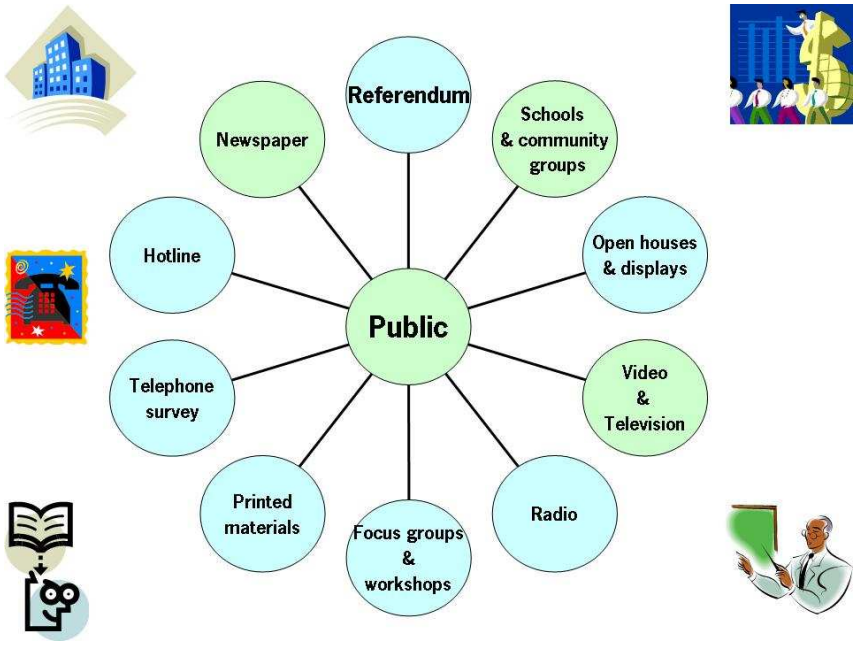
3.8 Participation

Many stakeholders



To have a successful dialogue and negotiations to finalize the ICZM strategy and implantation programme, participation of all stakeholders has to be ensured. There are many tools to enhance participation. Not all stakeholders will response similar to these tools. Which tool(s) have to be selected depend on the stakeholders. Government agencies needs a different approach compare to e.g. a fishery community. Some tools are needed to ensure active involvement and to avoid that stakeholder groups fall out, e.g. focus groups, community groups or even a referendum.

Communication tools



3.9 Capacity Building

Capacity buidling

Capacity building in ICZM should, like in IWRM, focuses on (GWP, 2003):

- Creating an enabling environment with appropriate policy and legal frameworks;
- Institutional development, including community participation, and;
- Human resources development and strengthening of management systems.

How this should be done, depends on the scope of the proposed ICZM plan, see e.g. the paper of Hong and Xue (2003), in which they describe the building of a training base of integrated coastal zone management in Xiamen Province in China.

Question ?

i) How was the capacity building in the Xiamen ICZM programme organised?

ii) At which levels the capacity building in this project was aiming and what were the main activities/components?

iii) The authors are quite possible of the impact of the capacity building activities. Do they also discuss constraints or drawback during implementation? If so, how can these constraints be improved in future projects? If not, do you think this is truth/realistic?

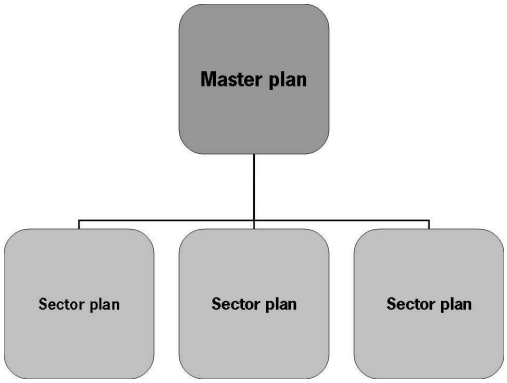
4 Implementation instruments and methods

📖 Self study

- Clark (1996): Chapter 1.6 Program development (page 51 – 62)
- Clark (1996): Part 2 Management Methods and Part 3 Management Information
- UNEP (1997), Chapter 3.5 – Yemen
- Zandri (2003): Saving Socotra – the treasure island of Yemen

Context

After the strategy for a sustainable development of a coastal area has been finalized and agreed upon, a programme for the implementation has to be drafted. In general, such a programme consists of a master plan, which dictates the content, form and scope of the programme, and a number of more detailed sector plans.



4.1 Master Plan

Master Plan

The Master Plan identifies options for development that are economically sound, socially just and that maintain the natural resource base. It recommends governmental and private actions, specifying:

- Jurisdiction
- Land use, protected areas, etc
- Regulatory program – permits and reviews
- Environmental impact assessment
- Operational management
- Information services
- Reviews and evaluation

Most of these aspects have already been discussed in Chapter 3, in this chapter only some specific aspects related to the programme development will be addressed.

Question?

In a study conducted by UNEP (1997), priorities and management objectives to reduce pollution problems in the Red Sea and Gulf of Aden have been identified. What are these priorities and management objectives?

Are these priorities and options also relevant for your area?

4.2 (Re-)orientation and Jurisdiction

Cooperation between organisations

ICZM aims to improve coordination between government agencies ad all levels and in new fields. Quite often, there is overlap in the existing activities and jurisdiction. If this is the case or if a new filed of activities is initiated, the legal status of (some) of these authorities has to be reshaped. Alternatively a new organization can be created, see e.g. the Socotra Conservation Fund.

4.3 Land use, protected areas, etc

Land use

Land and water resources are often scarce and ecological sensitive, thus for further development priority setting and zoning is required. This also applies for protected, restoration and rehabilitation areas. Because the land and water resources are often scares, the demands will be exceed the resources, thus conflicts of interests are likely. In those cases, conflict management and enforcement are required.

Example

Socotra Zoning Plan

Although the whole Socotra archipelago is considered a special conservation area of high global importance, there a people living, A zoning plan has been prepared for the conservation and sustainable use of biodiversity and natural resources. Three main zones form the basis of the plan:

- Resource use reserve, which contains general use zones
- National park, which contains areas of special botanical interest, and
- Nature sanctuaries.

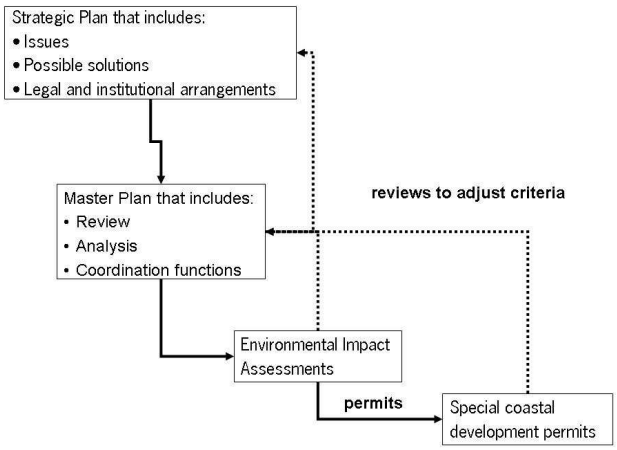
The main user functions in the archipelago are: industrial development, airport, hospital, road construction, intensive agriculture, controlled grazing, traditional plant use, ecotourism and research and education.

For each zone is specified which user functions is allowed.

4.4 Regulatory program – permits and reviews

permits & reviews

A major purpose of the ICZM programs is to review developments to determine the impacts on coastal resources and biodiversity. Based on these reviews, the criteria for projects can be changes, e.g. adjustment of the zoning criteria in the Master Plan or permit criteria based on the EIA.



Specific considerations for Environmental Impact Assessments in coastal areas will be discussed in Chapter 4.

Question ?

In the UNEP (1997) study mentioned in Chapter 4.1, priorities and objectives to solve pollution problems have been studied. The same report also evaluates the effectiveness of the adopted strategies. What recommendations are made to improve the effectiveness?

4.5 Operational management

Operation management

An ICZM programme can be designed to fit into any government structure. It can range from a simple office within an existing governmental organization only for impact assessments for development project to separate organization responsible for a comprehensive, full-service program of economic development, conservation, education, and social well-being. But even in its most rudiment form it should have the following three elements:

- A central ICZM coordination office
- A project review/permit system
- Empowerment to ensure compliance with the program, its requirements, guidelines and standards.

Question ?

Has the Socotra Conservation Fund these three elements?

Group Assignment

i) Check if there is a master plan in the region your group has selected?

ii) If so, has this master plan been used to specify development activities in various sectors?

iii) Check whether this master plan and/or sector plans are in line with national government policies, e.g. in the field of agriculture, water use, environment, socio-economic developments, etc.

iv) Clark (1996) in part 2 and 3 of his handbook has summarized the management methods and management information for all kinds of users function. Check if you have all methods and information for the user functions in your area.

5 EIA for sustainable development of coastal zones

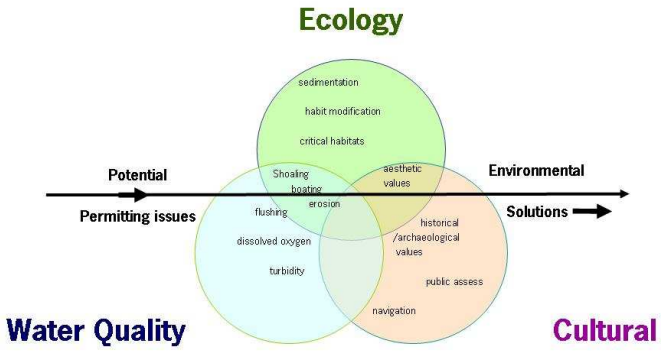
📖 Self study

- Beatley et al (2002): Chapter 9 – Creative Coastal Development: Building Sustainability along the Coast and Chapter 10 – Conclusions.
- Bos et al (2007). Quantifying the sustainability of agriculture.
- Dauvin (2005): Expertise in coastal zone environmental impact assessments
- Tiwi (2004): Chapter 8 – Recommendations to improve the coastal EIA
- Lecture notes on Environmental Impact Assessment

Context

In this chapter we will discuss the specific elements of an Environmental Impact Assessment (EIA) to make coastal zone development more sustainable. EIA's has been extensively treated in the first semester of the course. In this chapter we will discuss the challenges to use EIA to make the coastal zone development in Yemen more sustainable.

Finding a balance between resources and use



5.1 Constraints in using EIA in ICZM practices

Constraints in using EIA in ICZM practices

A analysis of a ICZM project in Indonesia showed that there were some constraints in using EIA's, i.e.:

- **Limited availability of important data**: EIA guidelines provide limited details on indicators of specific marine/coastal aspects
- **Limited information sharing**: no methodology to share information between offices at local, provincial and central level and lack of communication with the consultants
- **Deficiencies in the EIA to use environmental information**: limited possibilities to revise EIA processes, emphasis on qualitative rather than quantitative analysis.
- **Poor information management**: lack of availability of local information, fragmented responsibilities, lack of research and investigations
- **Lack of empowerment of the participating stakeholders**: stakeholders were mainly used to provide data and not to participate in the analysis and

decision-making process

- **Limitations faced by the stakeholders**: results and findings were presented in such a way that there were practically inaccessible for stakeholders, both in writing and during meetings ("technical/expert" language), distance restricted communication, etc.

It is obvious that most of these constraints are not specific for coastal areas, but still it is good to look at the recommendations:

How to improve EIA ?

- The use of **specific marine/coastal environmental information** and **stakeholder participation** greatly improved the EIA's as a management tool for ICZM.

- An **Information System** greatly improved the understanding of the coastal processes and availability of information for the various stakeholders. For example, the information system provides the district government with integrated environmental information on selected coastal and marine aspects on sea grass, fishery, coral reef and birds as selected parameters for environmental monitoring.

Question ?

Thus, there is a need for more specific marine and coastal environmental information. Dauvin (2005) in his correspondence paper addresses this issue. What is the advise he gives to:

- Decision-makers
- Research consultants, and
- Specialist working on EIA's?

5.2 Towards more sustainable development

Sustainable development does not mean *no* growth, it means *not wasting* resources. The resources should be used in an efficient way, the degradation of renewable resources should be reversed and implementing strategies for the sustainable use of land, water, biological and genetic resources, and energy should be developed. This can be gone using the following principles (after Beatley et al, 2002):

Sustainability principles

- Minimize the amount of water, energy, and other resources needed for development
- Incorporate renewable energy
- Use local building materials and materials obtained from sustainable management resources
- Minimize waste during construction and operation; recycle and use previously used building materials
- Build compactly and conserve as much coastal land as possible: cluster away from wetlands, beaches, and other sensitive areas like coral reefs, sea grass areas, etc.
- Locate new developments in close proximity to public transit, to town centres and resident areas; discourage use of cars
- Choose in-town locations over rural or exurban sites; look for opportunities to strengthen and revitalize existing coastal cities and towns
- Minimize the embodied energy of structure, i.e. the energy necessary to

produce the materials for building, but also the energy to operate the buildings
- Look for infill sites and opportunities to reuse the built environment before developing unspoiled locations
- Design and built to last: durability and quality should be favoured over short-term profit
- View every project as an opportunity to restore and rehabilitate damaged coastal ecosystems
- Protect trees, vegetation, and existing elements of the natural landscape (e.g. terraces)
- Reduce impervious surfaces and maintain the natural hydrology of the landscape
- Avoid hazardous coastal locations, such as floodplains, and high erosion zones
- Strive to make projects affordable and create economically and ethnically diverse neighbourhoods and communities
- Design projects through an inclusive, participatory process; affects stakeholders should be consulted and have the opportunities to influence developments
- Incorporate features that educate future residents about ecological sustainability; make visible the natural processes on which we all rely
- Search for designs that harmoniously blend projects into the natural and cultural landscape; design and build to strengthen sense of place
- Incorporate design elements that strengthen connections for others and the broader community; discourage developments that separate and isolate from the broader community.

Your challenge

This is a long list of principles, some look quite ambiguous, but most of them can be incorporate, one way or the other, in the existing practices. It is a long way to go, but it is your challenge to do this.

Group Assignment

For each of these principles, give (practical) examples how these principles have been used in your coastal region and if they have not been applied, give examples how it could have been done.

5.3 Indicators for coastal sustainability

The challenge is to build these principles in the EIA process. The best way to do this is to develop indicators for coastal sustainability. Examples are (after Beatley et al 2002):

Indicators for sustainability

Land and Development
- Percentage of coastline urbanized
- Amount of agricultural land developed per year
- Amount or percentage of development occurring on coastal infill
- Extend of farmland or rural land lost each year and over time

Water
- Extend of fishable and swimmable water; changes in water quality over time
- Extent of pervious and impervious surfaces; changes in pervious and

impervious cover

Hazard Exposure
- Number of structures within 60-year erosion zone
- Number of unelevated structures in floodplain

Air
- Number of days in violation with clean air criteria

Wetlands
- Acreage of coastal wetlands converted, each year and over time
- Acreage of existing and protected wetlands

Natural Habitat
- Change in natural habitats
- Extent and status of endangered species
- Extent and status of biodiversity hot pots

Fisheries and Marine Resources
- Health of coral reefs, sea grasses, and other marine habitats
- Status and condition of local and regional fisheries
- Number of oil spills
- Number of waste water outlets

Equity and Affordability
- Housing affordability measures
- Unemployment rates in coastal zone

Recreation and Coastal Access
- Number of beach access points (per shoreline kilometre and/or per capita)
- Acreage of public beach

Energy and Resource Use
- Water consumption (per capita and/or per resource: surface water, groundwater and/or sea water)
- Energy consumption (per capita)
- Renewable energy consumption (per capita)
- Recycling rate
- Solid waste generated per year
- Number of treatment plants with tertiary and advanced treatment

Transportation and Mobility
- Modal share for walking, public and private transport

Group Assignment

Select an indicator related to IWRM and quantify this indicator so that it can be used in ICZM in your region.

A performance indicator should be (Bos et al 2007):
- **Science based**. An indicator should be based on theoretical or empirically quantified, statistically tested, causal model of that pat of the process it described.
- **Reproducible**. The data needed to quantify the performance indicator must be measurable with available technology, reproducible and

verifiable.

- **Transparent.** Performance indicators should be transparent to the customers of the product.
- **Manageable**. This requirement for an indicator is particularly important as implementation is the ultimate goal. Particularly for routine management, performance indicators should be technically feasible, and easily used by policy makers, assessing staff and by other stakeholders given their level of skill and motivation.
- **Cost-effective**. The cost of using indicators in terms of finances, equipment, and human resources, should be well within the stakeholders' income and monitoring budget

6 Group Assignment during the excursion

Group Assignment during the excursion

During the excursion to Aden, we will visit, among other,

(1) Environmental Protection Authority in Aden
(2) Local Government Council
(3) Marine Science Centre
(4) Al-Heswa Desalination Plant, and
(5) Aden Refinery.

Make 5 groups and let each group select one of these organizations.

Each group makes a brief report of the visit to the organization, with special emphasis on the following:

- Which are the main user functions of this organisation?
- What are the resources that are used by the organisation to carry out its activities?
- Are there other users that use the same resources?
- Are there conflicts of interest?
- Does the organization incorporate sustainable development principles in its activities? If so, describe how this is done.
- Have these activities been subject to an EIA?
- Were these EIA specifically focus on coastal zones and if so, what kind of indicators were used that are specific for coastal zone development?
- Mention three strong points related to sustainable management practices used/developed by this organization that you think can be used by other organizations/projects.
- Make three recommendations how this organization can enhance their sustainable management practices.

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Glossary

Competent Authority: sector of government responsible for requiring EIA (Tiwi, 2004)

Coastal EIA: environmental impact assessment for development activities in the coastal area (Tiwi, 2004)

Coastal monitoring: monitoring of selected environmental parameters and indicators to determine quality of the coastal and marine components (Tiwi, 2004)

Coastal zone: the region where the tidal processes are capable of affecting man's activity or of being influenced by man (International Commission on Irrigation and Drainage, Working Group on Sustainable Development)

Consultant: group of experts that on behalf of the proponent conducts the compilation of EIS (Tiwi, 2004)

Criterion: a range of an indicator used to classify the indicator value in an acceptable and/or non-acceptable range (International Commission on Irrigation and Drainage, Working Group on Sustainable Development)

Environmental effect: a specific change in the environment caused by an existing or proposed development (Tiwi, 2004)

Environmental impact assessment (EIA): a planning tool for identifying, predicting, evaluating, and mitigating the bio-physical, social, and other relevant effects of proposed development activities, to support the decision-making process (after Tiwi, 2004)

Environmental Impact Statement (EIS): a report as a product of the EIA process containing a detailed and in-depth research on the significant impacts of a proposed development plan (Tiwi, 2004)

Environmental information: information as listed in the EIA that represents environmental components: each component consists of several parameters, and each parameter consists of indicators (Tiwi, 2004)

Indicator: see performance indicator

Integrated Coastal Zone Management: a process of governance for coastal and marine areas in order to optimise benefits form the coastal zone development and coastal resource management, and to minimise negative effects of such activities on the coastal resources and environment (Tiwi, 2004)

Institutional capacity in EIA: sufficient capacity of district government on information management, on stakeholder participation, and to conduct the scoping and EIS review meetings (Tiwi, 2004)

Marine information: environmental information related to the physical and biological components of the marine area (Tiwi, 2004)

Mitigation measures: measures to prevent and limit the negative impacts of the proposed development (Tiwi, 2004)

Monitoring measures: measures for regular data collection to assess the environmental

changes caused by impacts of a proposed development (Tiwi, 2004)

Objective: a broad goal that reflects the overall purpose of the irrigation or drainage system or the sector within the irrigation and drainage system falls. Typically, objectives are not precise, exemplified by such phrases as crop diversification, equity, adequacy, or sustainability (Murray-Rust and Snellen, 1993).

Parameter: a quantitative or qualitative value of measurement or observation (ICID Working Group on Drainage)

Proponent: owner of the proposed development activity or plan subject to EIA (Tiwi, 2004)

Performance assessment: the systematic observation, documentation and interpretation of activities related to agricultural water management with the objective of continuous improvement (after Bos et al 2005).

Performance indicator: A (dimensionless) indicator whose ratio includes both an actual value and an intended (target or critical) value of data on the considered key parameter.

Target: a specific value of something, e.g. an objective that can be measured: it provides information on a desired condition that should be met if an objective is to be fulfilled (Murray-Rust and Snellen, 1993).

Quality of EIS: quality of environmental information as described in the EIS based on review criteria (LEE, 2000)

Scoping: the process prior to the impact assessment to identify potential effects of a development via interconnections with other existing or proposed activities (Tiwi, 2004)

Sectoral management: management of land and sea areas based on sector of activities, such as fishery, transportation, agriculture, etc. (Tiwi, 2004)

Stakeholder: people and institutions who have a direct and indirect interest in the proposed development and its possible impacts (Tiwi, 2004)

Stakeholder participation in EIA: the active involvement and participation of the stakeholders in decision-making in all stages of the EIA process (Tiwi, 2004)

Stakeholder participation in ICZM: process of involving stakeholders in decision-making in the ICZM process in order to foster sustainable development of a coastal zone (Tiwi, 2004)

Stakeholder participation measures: measures to improve stakeholder participation including measures to identify stakeholders, to raise participation awareness, to disseminate information and to invite input (Tiwi, 2004)

Technical team: a review team of EIA experts in various fields set-up by the EIA commission to implement the reviews of the EIS (Tiwi, 2004)

Appendix 3 PowerPoint "Managements Strategies and Instruments"

ALTERRA-ILRI

INTEGRATED COASTAL ZONE MANAGEMENT

Theme 4: Sustainable development of coastal zones in Yemen

Management Strategies and Instruments

Henk Ritzema
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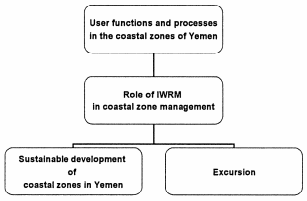
RS38

Objectives: after finalizing this module you should

- Know what the ICZM concept is about, what important ICZM issues in Yemen are and the role of the IWRM can play in the sustainable management of coastal zones in Yemen;
- Be able to identify the user functions, forces and processes in the coastal zones of Yemen and how they cause pressure on the natural system;
- Be able to apply the principles of IWRM to sustain development in the coastal zones of Yemen;
- Know which information is needed in ICZM and how to obtain this information by monitoring and research programs.

ALTERRA-ILRI

Methodology



ALTERRA-ILRI

Theme 4: Sustainable development of coastal zones in Yemen

Subjects:

4.1 Management strategies & instruments (6 hours)

4.2 Information Needs, Monitoring and Indicators (6 hours)

4.3 Practical & exercises (12 hours):
Assignment no. 8: Which technologies are available?
Assignment no. 9: Constraints and opportunities
Assignment no. 10: Development of a monitoring plan

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Management strategies and instruments: Subjects

- Towards a strategy for integrated coastal zone management.
- Factors affecting the planning process of integrated coastal zone management.
- Implementation instruments and methods for integrated coastal zone management.
- Environmental impact assessments for integrated coastal zone management

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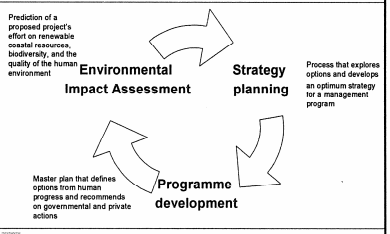
Towards a strategy for integrated coastal zone management



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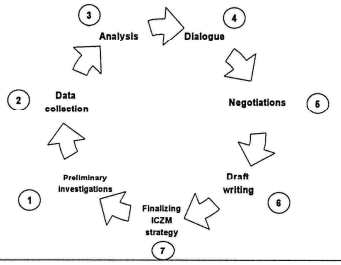
Step 1: Strategy planning: Process



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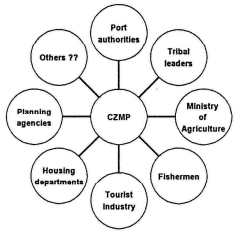
Strategy planning: Stakeholders



Many stakeholders
↓
ICZM has to provide a framework for coordination

Question: do you know other stakeholders in the Yemen?

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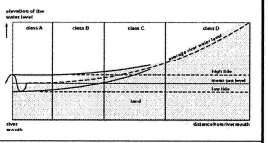
Strategy planning: Setting (1)

Definition: The region where the tidal processes are capable of affecting man's activity or of being influenced by man. This roughly extends tidal areas between the following limits:

- On the seaward side up to the limit of conventional construction or dredging activity (typically of the order of 30m water depth);
- On the landward side up to the limit of the action of the sea, including all those areas that might be subject to flooding by seawater and up all estuaries and rivers to the tidal limit (the point where water levels are no longer influenced by tidal propagation).

Question: what is the definition of the coastal zone in Yemen?



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Strategy: Setting (2)

- Is the emphasis national or regional?
- Who are the expected beneficiaries of the ICZM program, both social and economical?
- Can these beneficiaries fund the ICZM program?
- Who are the major proponents and opponents of the proposed ICZM programme?
- What are the natural hazards and how can a ICZM program help to overcome these hazards?

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Strategy planning: Objectives

- Maintain a high quality coastal environment
- Protect species diversity
- Conserve critical habitats
- Enhance critical ecological processes
- Control pollution
- Identify critical lands
- Identify land for development
- Protect against natural hazards
- Restore damaged ecosystems
- Encourage participation
- Provide planning guidance
- Provide development guidance

Assignment:

i) List the objectives for your region

ii) Are there conflicting objectives?

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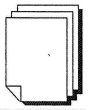
Strategy planning: Multiple Use

- Fisheries
- Aquaculture
- Agriculture
- Mining
- Water supply
- Urban development
- Biodiversity
- Ports and harbour development
- Recreation/tourist development
- Human settlement
- Industrial development

Assignment:

i) List the land and water resources requirements for all the user functions.

ii) Are theses user functions conflicting?



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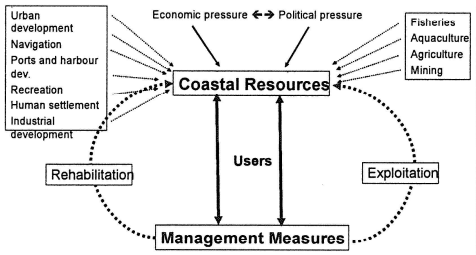
Strategy planning: Integration



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Strategy planning: Coordination

Many stakeholders
↓
ICZM has to provide a framework for coordination

Assignment:

i) List all stakeholders and group them per land use functions.

ii) To the have the same interest or are they conflicting?

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Strategy planning: Institutional

ICZM requires involvement of all levels of government:

- Local
- Provincial/district
- National/central.

Why?

Assignment:

i) List all government agencies involved in ICZ and describe their functions/roles

ii) Are they in line with each other or is there overlap, point of conflict?.

The ICZM should be mandated → legislation is needed !!!

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Strategy planning: Incremental approach

ICZM is complex, numerous stakeholders are involved, flexible and never-ending (why?), thus follow an incremental approach:

- Year by year
- Function by function
- Resource by resource
- Issue by issue
- Region by region

Assignment:

For your region, describe how IZCM is done at present.

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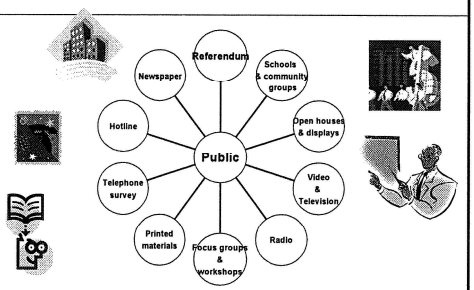
Strategy planning: Participation



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Strategy planning: Data collection

Data should:

- Enhance the decision-making process
- Clearly depict the trade-offs between the present situation and an integrated approach
- Lead to the clearest and least ambiguous set of objectives and/or mandates for the implementing agency.

Examples:

- Users of coastal areas and resources
- Coastal renewable resources
- Environmental impacts
- Upland effects
- Socio-economic effects
- Critical habitats
- Critical species
- Resource problems, issues and conflicts
- Natural hazards
- Natural reserves

Assignment: Specify these examples for your region.

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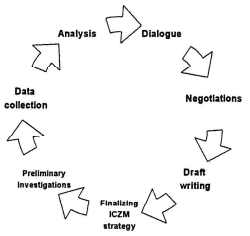
Strategy planning of a ICZM program: Process



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Strategy planning: Summary

Developing an ICZM strategy is complex thus:

- → Keep it simple
- → Keep it politically and administrative viable
- → Avoid unrealistic goals
- → Avoid excessive complexity
- → Provide a framework for coordination
- → Keep it flexible

→ And remember ICZM is a tool to create a mechanism for sustainable development of the coastal resources

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Example of an ICZM strategy

1. Investigation of issues and needs
2. Review of policies
3. Formulation of goals and objectives
4. Pre-planning review activities and preliminary strategy report: resources, legal/institutional, socio-economic, plan boundaries, etc.
5. Organisation of planning program: funding, staff, facilities, equipment, operational strategy
6. Implementation of master planning program: data collection, analysis, mapping, public hearings, etc.
7. Drafting, redrafting, and production of final plan

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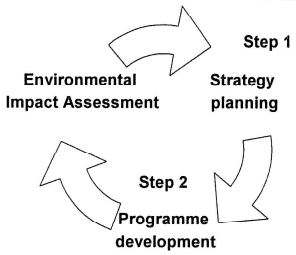
Towards a strategy for integrated coastal zone management



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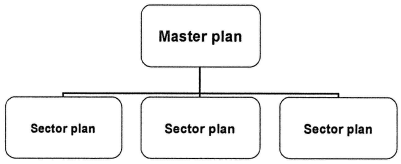
Step 2: Program development



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Program development: Master Plan

The Master Plan:

- Identifies options for development that are economically sound, socially just and that maintain the natural resource base
- Recommends governmental and private actions, specifying:
  - (Re-)orientation and jurisdiction
  - Land use, protected areas, etc
  - Regulatory program – permits and reviews
  - Environmental impact assessment
  - Operational management
  - Information services
  - Reviews and evaluation

Assignment:
Check if there is a master plan in the region your group has selected ?

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Master Plan: (Re-)orientation and Jurisdiction

ICZM aims to improve coordination between government agencies ad all levels and in new fields

↓

Check if there is overlap in the existing jurisdiction

↓

Legal authorities often have to be reshaped

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Master Plan: Land use, protected areas, etc

Land and water resources are often scarce and ecological sensitive

↓

Priority setting is needed → zoning is required also for protected areas and restoration and rehabilitation areas

↓

Enforcement & Conflict management is often required

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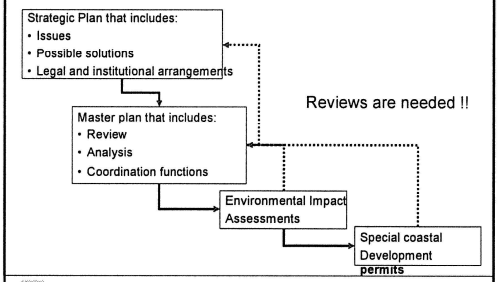
Master Plan: Regulatory program – permits and reviews



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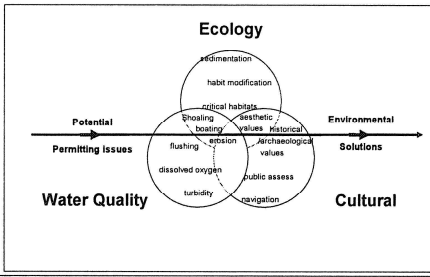
Master Plan: Environmental impact assessment



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Master Plan: Operational management

- A central ICZM coordination office
- A project review/permit system
- Empowerment to ensure compliance with the program, its requirements, guidelines and standards

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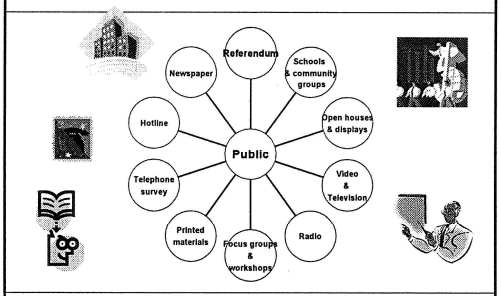
Master Plan: Information services



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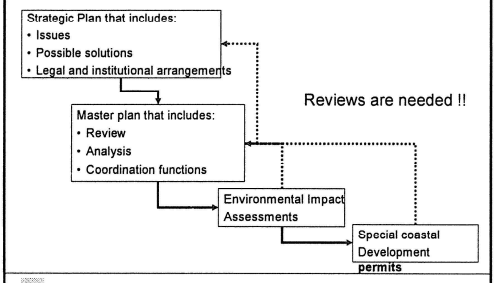
Master Plan: Master Plan: Reviews and evaluation



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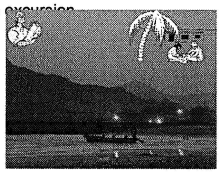
Environmental impact assessment for ICZM

- Constraints in using EIA's in ICZM practices
- Towards more sustainable development
- Indicators for coastal sustainability
- Group assignment during the excursion



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Constraints in using EIA's in ICZM practices

- Limited availability of important data on marine and coastal aspects
- Limited information sharing: no methodology
- Deficiencies in the EIA to use environmental information: no possibilities for revisions
- Lack of empowerment of the participating stakeholders: only used to supply information, not involved in the analysis and decision-making
- Limitations faced by the stakeholders: information inaccessible – "technical/expert" language

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Recommendation to improve EIA

- Increase the use of specific marine/coastal environmental information
- Increase stakeholder participation
- Set-up of an Information System that provides information based on the stakeholder's needs (not all stakeholders want the information in the same format)

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Towards more sustainable development

Sustainable development does not mean *no* growth, it means *not wasting* resources

↓

Use principles based on this principle, e.g.

- Minimize the amount of resources (water, energy, etc)
- Use renewable resources
- Concentrate developments
- Increase infiltration of rainwater
- Design through a participatory approach
- Design in harmony with the surroundings

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Your challenge: translate these principles in indicators (1)

Land and Development

- Percentage of coastline urbanized
- Amount of agricultural land developed per year
- Amount or percentage of development occurring on coastal infill
- Extend of farmland or rural land lost each year and over time

Water

- Extend of fishable and swimmable water; changes in water quality over time
- Extent of pervious and impervious surfaces; changes in pervious and impervious cover

Air

- Number of days in violation with clean air criteria

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Your challenge: translate these principles in indicators (2)

Wetlands
- Acreage of coastal wetlands converted, each year and over time
- Acreage of existing and protected wetlands

Natural Habitat
- Change in natural habitats
- Extent and status of endangered species
- Extent and status of biodiversity hot pots

Energy and Resource Use
- Water consumption (per capita and/or per resource: surface water, groundwater and/or sea water)
- Energy consumption (per capita)
- Renewable energy consumption (per capita)
- Recycling rate
- Solid waste generated per year
- Number of treatment plants with tertiary and advanced treatment

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Group assignment during the excursion (1)

During the excursion to Aden, we will visit, among other,
- Environmental Protection Authority in Aden
- Local Government Council
- Marine Science Centre
- Al-Heswa Desalination Plant, and
- Aden Refinery.

Assignment:
Make 5 groups and let each group select one of these organizations

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Group assignment during the excursion (2)

Each group makes a brief report of the visit to the organization, with special emphasis on the following:
- Main user functions
- Used resources
- Other users for the same resources?
- Conflicts of interest?
- Are sustainable development principles used?
- Have EIA been made?
- Were these EIA's focused on coastal zones
- Indicators used?
- Three strong points
- Three recommendations for improvement

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Objectives: after finalizing this module you should

- Know what the ICZM concept is about, what important ICZM issues in Yemen are and the role of the IWRM can play in the sustainable management of coastal zones in Yemen;
- Be able to identify the user functions, forces and processes in the coastal zones of Yemen and how they cause pressure on the natural system;
- Be able to apply the principles of IWRM to sustain development in the coastal zones of Yemen;
- Know which information is needed in ICZM and how to obtain this information by monitoring and research programs.

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Management strategies and Instruments

The challenges is yours !!

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