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COMMITTEE ON  
PROTECTION OF THE  
SEA

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## Global Environment Facility

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GEF MSP Sub-Saharan Africa Project (GF/6010-0016):

“Development and Protection of the Coastal and  
Marine Environment in Sub-Saharan Africa”

Third Meeting of the Working Group on Integrated  
Problem Analysis (WGIPA-III)  
Cape Town, South Africa, 10-11 September 2001

# REPORT OF THE THIRD MEETING OF THE WORKING GROUP ON INTEGRATED PROBLEM ANALYSIS (WGIPA-III)

London, 24 October 2001

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\*Slides are presented in outline view to limit the size of the file.

## **1. Opening**

Hon. Deputy Minister Rejoice Mabudafhasi, Chairperson of the African Process and Deputy Minister of Environmental Affairs and Tourism of South Africa, opened the meeting by welcoming the participants and emphasising the importance of the African Process as a mechanism for ensuring sustainable coastal development and alleviating the poverty of coastal communities. She recalled the preparations leading up to the World Summit on Sustainable Development, to be held in Johannesburg, September 2002, and the high visibility that the African Process and Partnership Conference will obtain by being held in conjunction with the Summit.

Mr Horst Kleinschmidt, Deputy Director-General, Marine and Coastal Management, Ministry of Environmental Affairs and Tourism of South Africa, stressed the importance of this project for his government and the great spirit of regional cooperation that it was promoting. He recalled that poverty alleviation was a priority for South Africa, and that the holistic approach adopted by the project represented an interesting tool for tackling environmental degradation at its roots.

Dr Viktor Sebek, Executive Director of the Advisory Committee on Protection of the Sea (ACOPS), recalled the political context surrounding the African Process and GEF MSP, and in particular the recent decision adopted by the July 2001 Lusaka Summit of the OAU which calls for holding the Partnership Conference on the margins of the WSSD, at the level of Heads of State. He stressed the importance of presenting the recommendations of the Working Group to the upcoming Joint Meeting of the Steering Committee of the GEF MSP and the Preparatory Committee for the Partnership Conference. He thanked the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific, and Cultural Organization (IOC of UNESCO) and UNEP for the high level of co-operation demonstrated in the last few months. He invited Mr Julian Barbière, representative of IOC of UNESCO to chair the meeting. The statement of Dr Sebek is attached as **Annex I**.

Mr Julian Barbière welcomed the participants, and congratulated the national teams for the hard work and commitments demonstrated since the inception of the project, which resulted in the project delivering its first concrete outputs, the eleven national reports. IOC of UNESCO has played, together with ACOPS, a leading role in this first phase of the project and will continue to mobilise its technical capacity to make the African Process a success.

Mr Ellik Adler, co-ordinator of the Regional Seas Programme in UNEP, greeted the meeting on behalf of the Executive Director of UNEP, Mr Klaus Töpfer. He mentioned UNEP's commitment to the GEF MSP project for sub-Saharan Africa, especially in view of the decision taken by its Governing Council in February 2001, regarding the support to Africa. He noted that UNEP supported the addition of four countries to the project and expressed its intentions to assist in its implementation through the Nairobi and Abidjan Conventions. He also thanked ACOPS for its considerable role in the success of the project.

## **2. Overall context of this project, objectives of the meeting and adoption of the agenda**

Mr Barbière presented a general overview, recalling the recommendations of the PACSICOM (Maputo, July 1998) and Cape Town Conference (Cape Town, December 1998) calling for the organisation of a Partnership Conference in December 2001, which would bring African States and the donor community together with a view to seek and increase support for the development of project proposals for sub-Saharan Africa. A Preparatory Committee for the organisation of the Partnership Conference was subsequently established, composed of Côte d'Ivoire, Ghana, Nigeria, Kenya, Mozambique, Seychelles, and South Africa as well as international organisations

such as UNEP, UNESCO, IUCN, the Organisation of African Unity (OAU) and African Ministerial Conference on Environment (AMCEN).

At the request of the Preparatory Committee and representatives of the civil society, a proposal was submitted to GEF in March 2000 to fund a Medium Size Project (MSP) on the Development and Protection of the Coastal and Marine Environment in sub-Saharan Africa. The objectives of this GEF MSP were to:

- i) identify areas, sites or living resources of regional and global significance that are suffering measurable degradation;
- ii) identify areas, sites and resources of regional significance that, although not currently degraded, are threatened with future degradation either because of the sensitivity of the receptor or the magnitude of the activity posing the threat;
- iii) determine the sources/causes of this degradation and the associated scales of impact (national, regional and global) to provide a basis for calculating incrementality at regional and extra-regional scales;
- iv) determine, through root-cause analysis, the fundamental causes of the damage or threat posed; and
- v) design a programme of interventions addressing problems of regional priority that may be presented to the Partnership Conference.

The project was signed in August 2000 and is being implemented in two sequential phases leading to the scheduling of a Partnership Conference in September 2002: an analytical phase reviewing the issues pertaining to the degradation of particular marine and coastal sites and ecosystems, their impacts and causes, and a project preparation phase, translating the recommendations into tangible proposals for intervention.

To implement the first phase of the GEF MSP, a detailed methodology (modelled on the Global International Waters Assessment – GIWA), based on a scoping and prioritisation exercise, an analysis of environmental and socio-economic impacts and a causal chain analysis that progressively details the root causes of the problems identified in the preceding steps, was proposed. The methodology was implemented simultaneously in seven sub-Saharan African countries (with four added at a later stage) under the guidance and facilitation of IOC of UNESCO and ACOPS. The project was funded by the GEF under the Medium Size Project (MSP) category.

The output of this first phase is a set of eleven comprehensive national reports. The reports identify the main issues affecting coastal and marine resources in the countries, their environmental and socio-economic impacts, their immediate and direct causes, underlying pressures and root causes; they assess gaps and weaknesses and provide recommendations as to the best means for intervention to alleviate these problems.

Ms Sylvie Goyet, ACOPS consultant, presented the objectives of the third workshop of the working group on integrated problem analysis (WGIPA-III). She noted that it is a technical meeting that provides the experts an opportunity to finalise the first phase of the GEF MSP and lay the grounds for development of proposals and a programme of intervention.

The workshop will:

- take account of the work done during this analytical phase and highlight evidence and key national elements; and
- review the technical analysis in particular looking at commonalities, transboundary elements, regional aspects and levels of intervention.

The objectives of this workshop are to:

- progressively prioritise elements of the analysis and recommendations; and
- look for linkages, in particular with other countries and other partners.

The agenda was adopted by the participants as presented in **Annex II**.

Mr Barbière acted as chairman of the meeting.

### **3. Presentation of national reports**

The eleven national teams were invited to present their respective national reports, and in particular to highlight the salient features of the report, focusing on the analysis and the recommendations.

The presentations of the national reports are found in **Annex III**.

### **4. Presentation of regional consolidated analysis**

Ms Goyet presented the draft regional consolidated analysis that was prepared drawing from the eleven national reports. The document does not attempt to compare between countries but looks for critical evidence of common priorities and problems, i.e. factors of commonalities, transboundary elements, particular cause-effect relationships, and linkages between environmental degradation and sustainable development. As such, it then argues for a coherent, harmonised and cooperative approach. She presented the general outlay of the document and emphasised the following points:

i) Overall results:

- natural coastal and marine resources are a major resource base for community livelihoods and economic development;
- degradation of coastal and marine resources is evidenced at localised sites;
- extent and scope of degradation is not systematically known at national or regional levels, except for studies concerning specific spots;
- explicit links between these resources and development imperatives have been demonstrated;
- impacts of degradation are not sufficiently known; and
- cause-effect relationships are more difficult to establish at higher levels of the root cause analysis but differ substantially at immediate levels. Similar sectoral, institutional and root causes are highlighted across the causal chains.

ii) Methodology: a consistent approach has been used throughout the 11 countries, focusing on coastal and marine biological resources. The methodology has been adjusted based on expert judgments, the particular context of the country, and the availability of data and information. She noted that some of the teams have elected to focus on sites throughout the analysis, whereas some other teams have worked with sites only for the prioritisation exercise, and analyse impacts and causal chain with reference to issues as they affect the whole country.

iii) Selected issues: the selected issues from the scoring phase are: loss/modification of ecosystems, unsustainable use of resources, pollution and modification of stream flow and global change.

iv) Assessment of impacts: the exercise helped in:

- further substantiating the issues;
- providing ground and justification for decision making when electing;
- intervention against the cost of doing so;

- identifying indicators to monitor achievements and impacts of a proposed intervention; and
- examining transboundary elements.

For loss/ modification of habitats, the national analyses have focused on priority habitats and issues, including estuaries, mangroves, coral reefs, coastal erosion, and species. In terms of global changes, it should be noted that the reports analyse evidence of direct impact but more importantly, look at the fragility of certain ecosystems, the foreseen lost revenues, and the costs of mitigating and protecting the ecosystem. Also she reported that, though global changes have not been addressed as a subject of analysis except in Seychelles, Nigeria, and The Gambia, all reports have integrated causes related to global changes when examining sources of loss/modification of habitats and/or modification of stream flow.

The regional analysis also attempts to establish linkages between environmental degradation and sustainable development imperatives and highlight the significance of coastal resources to local livelihoods and national commercial sectors of the economy, the impacts of deteriorating health, and the costs – in terms of mitigation, protection, remediation – of the degradation.

- v) Causal chain analysis: cross-fertilisation between the causal chains should be noted. It is acknowledged that linkages are not straightforward or direct, and that the cause-effect relationships are complex.
- vi) A number of commonalties have been identified within and across national analyses, in particular in terms of root causes, institutional weaknesses and macro-economic factors.
- vii) Finally she pointed out that, in part because of the nature and focus of the methodology, a number of gaps can be identified in the analyses. In particular some of the economic sectors may contribute marginally on a national basis but significantly on a regional basis (for example, transshipping), and may have been overlooked; social welfare issues may not have been properly integrated into the assessment; and coastal health issues as a result of poor sewage and solid waste management have been examined in some cases but not in great detail. Some of these gaps would need to be further identified and explored when developing prioritised proposals and a programme of intervention.

The presentation of the regional consolidated analysis can be found in **Annex IV**.

## **5. Working group session reviewing analysis per issue**

The participants broke into three working groups (modification of streamflow; pollution; and overexploitation of fisheries) and then into four working groups the following day (loss/modification of ecosystems: mangroves; coral reefs and seagrass beds; coastal erosion and global change; and estuaries and lagoons). They reviewed the elements of the national reports on scoping, impacts and causal chain as well as the regional consolidated analysis. They worked at the identification of identified commonalties and transboundary elements.

The guidelines for the working groups and the reporting tables are attached in **Annex V**.

In addition to the elements spelled out in the tables, the following points should be noted, as they were highlighted in the discussions:

### *i) Pollution:*

- the Working Group addressed only oil pollution, but other issues are significant for countries, namely eutrophication, microbiology, chemical pollution, sewage, solid waste and suspended solids;

- international sea transportation and shipping, and oil tanker routes, though not identified specifically in the analysis, could be looked into;
- in that context, response and preparedness as well as contingency plans should be addressed for oil spills; and
- the meeting noted that the causes of oil pollution are not the same in all countries.

*ii) Stream flow modification:*

- the meeting highlighted the importance of ‘natural’ factors such as storms, erosion and ‘extreme events’, as well as anthropogenic factors such as dams;
- the meeting also noted that the issue of stream flow modification, possibly more than any other issue, needs to address freshwater needs, through river and watershed management, and appropriate water policies; and
- the importance of watershed basin and integrated water management were also discussed.

*iii) Overexploitation of fisheries:*

- the meeting noted the significance of destructive fishing practices and poaching, commenting they should be addressed. Changes in fishing gear/practices and alternative sources of livelihood were also mentioned. The need for greater regional and international co-operation, particularly for surveillance was recognised.

*iv) Loss/modification of ecosystems:*

- the representativity of ecosystems and habitats in existing marine protected areas and the need for extension and/or greater coverage of the habitats through protection was discussed;
- initiatives of co-management of natural resources were examined; and
- the meeting noted the importance of raising awareness with regards to identifying the value and significance of particular habitats (coral reefs, mangroves, estuaries).

## **6. Working group session reviewing analysis per sub-regions**

### *6.1 Overview of National Recommendations*

Dr Virginie Hart, ACOPS consultant, presented an overview of the national recommendations extracted from the 11 sub-Saharan national reports. Recommendations were observed to link closely to the immediate, sectoral and root causes of the causal chain analysis, and in addition addressed information gaps such as the need for more environmental and socio-economic data. The following broad categories of national recommendations were observed in the majority of countries:

- management of protected areas;
- conservation of biodiversity;
- economic evaluation of environment/habitat;
- Small Island Development States (SIDS);
- sustainable tourism;
- commitment of governments;
- monitoring and assessments (i.e. EIAs);
- community participation;
- participation of private sector;
- regional/international cooperation;

- strengthening of local administration;
- strengthening of institutional and financial powers; and
- public awareness.

The Regional overview of national recommendations is attached as **Annex VI**.

### *6.2 Working Groups on Recommendations per Sub-Regions*

The participants broke into four working groups divided along geographic lines in order to: a) review and prioritise the recommendations of the national reports; and b) identify the criteria and reference for prioritisation.

The working groups consisted of:

- 1) Senegal / Gambia;
- 2) Gulf of Guinea (Côte d'Ivoire, Ghana, and Nigeria);
- 3) East and South Africa (South Africa, Mozambique, Tanzania, and Kenya); and
- 4) Small islands states (Seychelles and Mauritius).

The guidelines and reports of the working group are presented in **Annex VII**.

The following points should also be noted:

- factors of commonalties were evident in the recommendations within each of the sub-regions - common problems, common concerns – giving grounds for possible regional interventions;
- the majority of the recommendations address the issue of insufficient data and studies, calling for greater research and assessment of the problems;
- a number of recommendations also suggest interventions in the area of:
  - marine protected areas;
  - development of policies and legislation;
  - enforcement;
  - restoration of habitats; and
  - alternative income;
- cross-cutting and institutional recommendations such as enhanced capacity building & training, and awareness raising have been cited; and
- many recommendations include elements of integrated coastal area management.

Reference and political/managerial considerations when reaching a consensus on these recommendations include:

- technical analysis from the national reports;
- environmental and sectoral national action plans and management strategies embodying the priorities of the governments; and
- availability of trained experts in the sub-regions.

### *6.3 Review and Prioritisation of Recommendations per Issue*

Dr Isabelle Niang-Diop, IOC consultant, introduced the plenary session indicating that from the working groups reports, it appeared that issues like modification of ecosystems and overexploitation of fisheries were common for the region. It emerged that coastal erosion is a major issue, although it had

not previously been identified as such. Depending on the situations, modification of stream flows as well as pollution were considered to be of importance at a sub-regional level. It was also noted that all of these issues have transboundary characteristics and/or implications. Some of the main recommendations, such as increased research and training, public awareness, enforcement and creation of policies/legislations, and resource management are of course general, but reflect the current situation in the countries (lack of data, weakness of laws and inadequate management). Others like restoration of ecosystems, development of aquaculture or development of alternative activities tend to be more practical. Finally she thanked the participants for the fruitful outputs of the different working groups.

## **7. Work Plan for the completion and finalisation of national reports**

Mr Barbière informed the participants of the intention of the project managers to have the eleven national reports properly edited, published, and distributed to partners as a concrete product of Phase I of the GEF MSP. It was agreed to target the end of December 2001 for publishing and distribution of the reports. ACOPS and IOC of UNESCO will provide the necessary support for editing, compiling and formatting the reports to a consistent standard. Based on the consolidated comments forwarded by the consultants, the national teams were requested to send their final draft reports to IOC of UNESCO and ACOPS by the end of September 2001 (electronic copy). These should include all sections, tables, annexes, reference, maps, etc.

The national teams were informed by IOC/ACOPS that new contracts will be shortly issued to each member of the national teams of the seven original countries with a view to provide support for the finalisation of their reports. UNEP will review this issue directly with the four countries that it is sponsoring.

## **8. Adoption of the report**

The report was adopted by the participants. The list of participants is provided as **Annex VIII**. The list of acronyms is attached as **Annex IX**.

## **9. Closure of the meeting**

Messrs. Barbière, Jeftic and Adler congratulated the participants for their active contribution and thanked the local organiser, the Department of Environmental Affairs and Tourism, in particular the branch of Marine and Coastal Management, for the assistance provided during the meeting. The session was closed at 17h30 on Tuesday, 11 September 2001.

## ANNEX I

### Statements

#### **Statement by Dr Viktor Sebek, Executive Director of ACOPS**

Hon. Minister, Mrs Mabudafhasi, Chairperson of the Preparatory Committee,

It is a great pleasure to be in Cape Town once again, barely two months after the Lusaka Summit of OAU raised the stakes of this Project, of the Partnership Conference and, I dare say, of Africa's anticipated contribution to the WSSD.

This is, I know, a technical meeting and all of us have come to hear the national reports from 11 countries, draw lessons in the concluding stages of Phase 1 before we embark on the critical work on development of Interventions Portfolio. African ministers who gathered here nearly three years ago demanded action, and action it is that we propose to suggest.

There is a great deal still to achieve and many serious difficulties to overcome, but let us observe with satisfaction that much has been achieved already:

- a holistic approach has been applied to the analysis of problems confronting protection and development of coastal and marine environment;
- an attempt was made to prioritise the problems and provide the basis for projects which will enjoy sub-regional and regional support;
- Africa has displayed a complete unity on this front thorough AMCEN and OAU, up to the level of heads of State;
- the Project has inspired Nigeria's political leadership to provide a unique political platform through the 'Joint Ministerial Statement on African Process', placing environment as a top foreign policy issue, galvanising also support from a score of other Government departments, from economic development to defence; and
- it is now felt that these issues should be addressed at the level of heads of state, signifying Africa's collective contribution towards WSSD. Moreover, the issues covered by this Project have now found their way in the environmental segment of one of the most important recent political initiatives in Africa, namely, the New Africa Initiative, which has now become topic of the latest MSP Project in Africa, which will no doubt be addressed by ministers next week.

ACOPS is most proud to have provided much of the steam for this project under its African political leadership, all of which will be "on display" next week: Ministers Mabudafhasi of South Africa, Okopido of Nigeria and the Permanent Secretary in the Ministry of Environment and Chairman of Nairobi Convention, Maurice Lousteau Lalanne.

I am grateful to them for their visionary leadership, but also wish to pay the tribute to the cooperation which we have had with our IGO partners, IOC of UNESCO which contributed so generously in terms of financial resources, but also in terms of full commitment of its scientific and technical services. It is for this reason that I would like to suggest that whilst it is customary for the representative of the Executing Agency (i.e. ACOPS) to chair the meeting, that this working group be chaired today and tomorrow by my friend and colleague from IOC of UNESCO, Mr Julian Barbière, who also ably chaired the Paris and Mombassa Meetings. ACOPS would then revert to chairing the working group on programme of interventions.

Our thanks are also due to UNEP, especially for enabling the Preparatory Committee to extend the application of methodology in this project to four additional countries. I gather that Mr Elik Adler will now work with us very closely until the final stages of this project.

But, above all, my warmest thanks are due to all to consultants, all members of national teams, and above all Sylvie Goyet, who braved her mountain falls and piloted this Group so ably, together with Dr Isabelle Niang Diop.

I look forward to a good debate in the next two days.

## **ANNEX II**

### **Agenda**

1. Opening
2. Overall context of this project, objectives of the meeting and adoption of the agenda
3. Presentation of national reports
4. Presentation of regional consolidated analysis
5. Working group session reviewing analysis per issue
6. Working group session reviewing analysis per sub-region
7. Work plan for the completion and finalization of national reports
8. Adoption of the report
9. Closure of the meeting

## ANNEX III

### National Presentations

#### The National Report of Côte d'Ivoire

#### Presentation of the Causal Chain Analysis - Côte d'Ivoire

by

**Jacques Abé, National Coordinator**

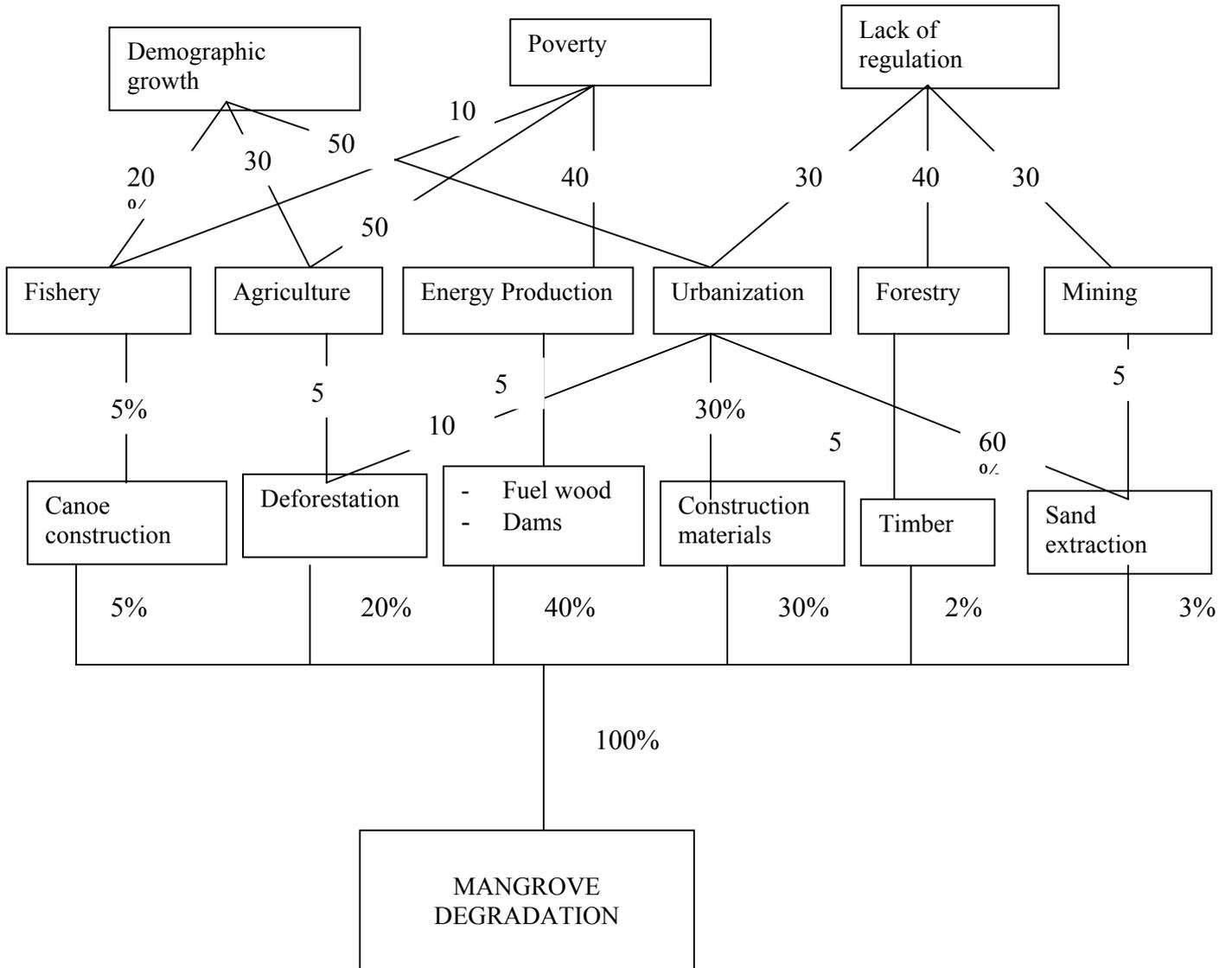
11 September, 2001

#### NATIONAL TEAM OF EXPERTS

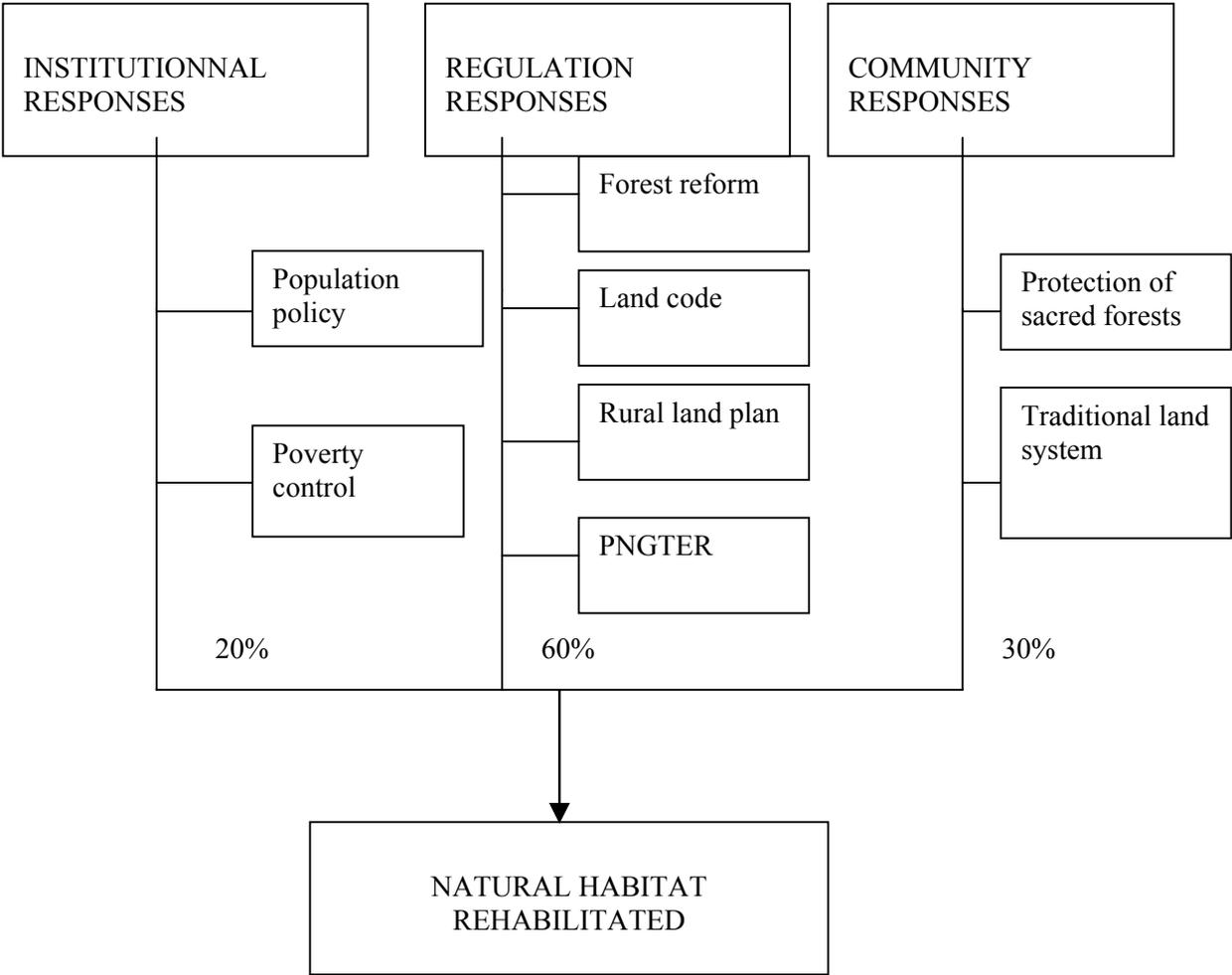
<b>ENVIRONMENT</b>	<b>SOCIO-ECONOMY</b>
Dr Jacques Abe	Dr Ibo Jonas
Oceanographer and Team coordinator	Sociologist
Environmental Geologist	Socio-economic expert
<b>POLLUTION</b>	<b>INSTITUTIONAL FRAMEWORK</b>
Kouassi Aka Marcel	Nguessan Ncho
Oceanographer	Lawyer
Water Pollution Expert	

# I. HABITAT DEGRADATION

Fig. 1 Diagram representation of causal chain analysis for mangroves degradation

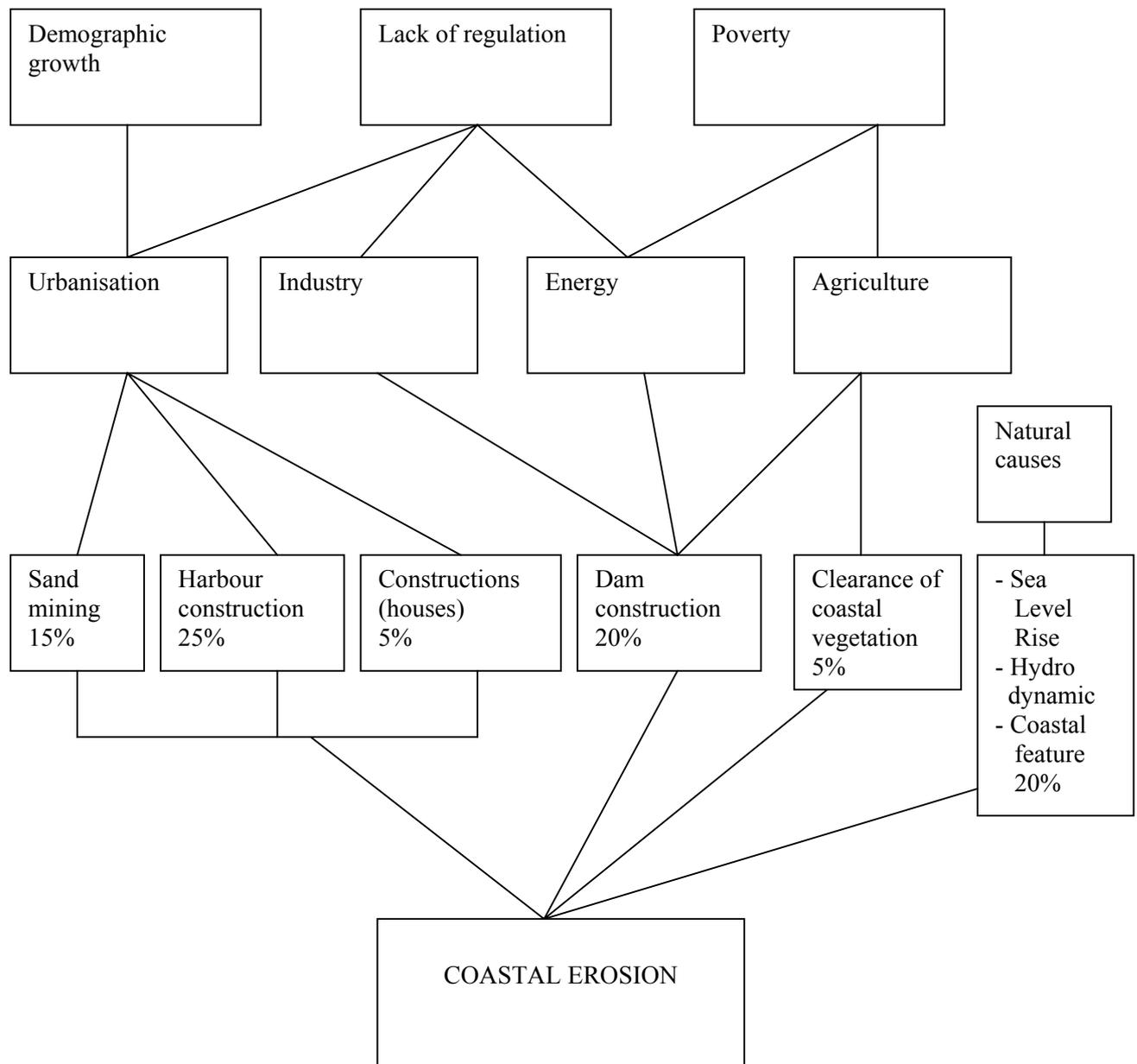


**Fig. 2 Responses for habitat restoration**



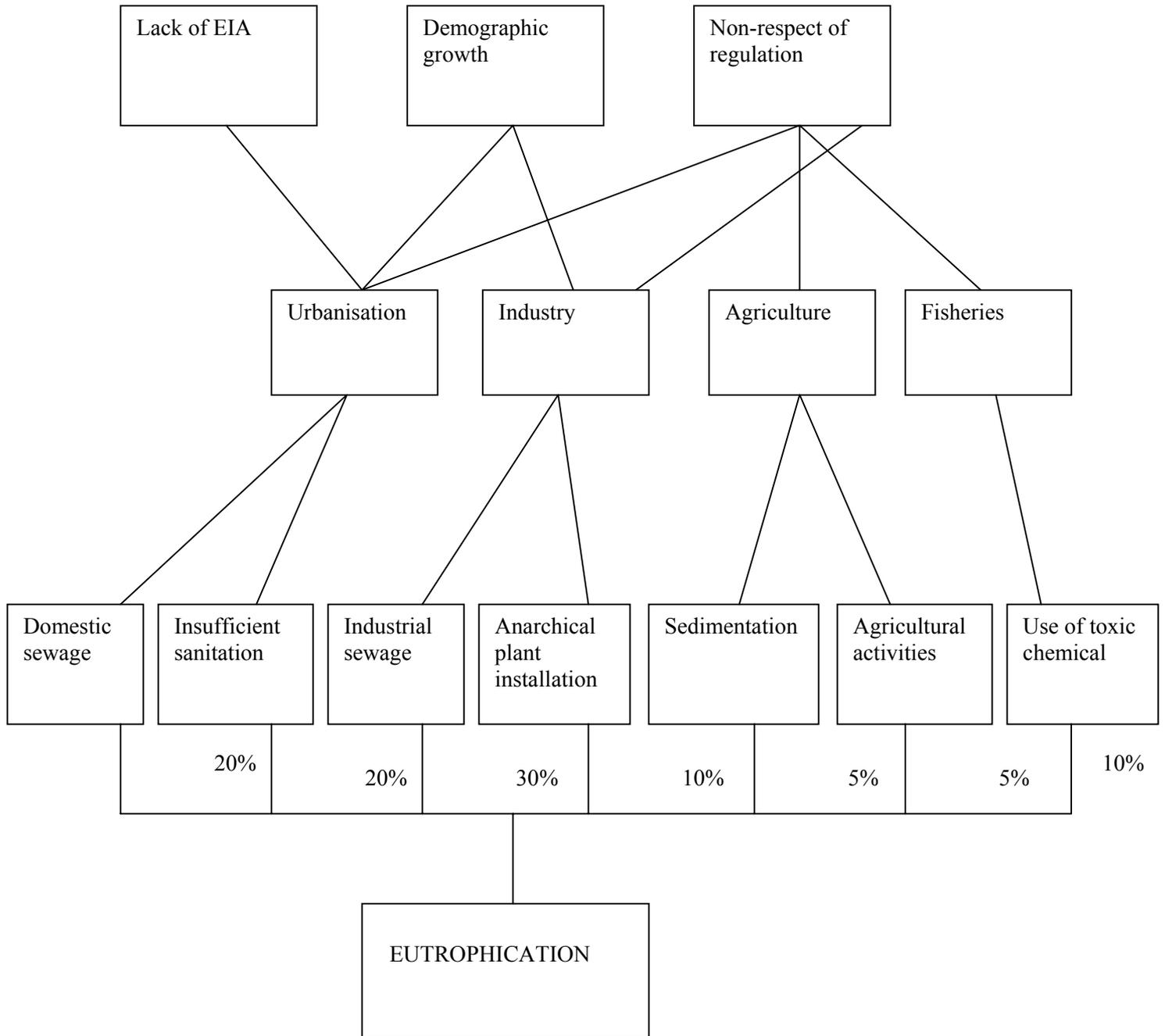
## I.2 COASTAL EROSION

Fig. 3 Diagram representation of causal chain analysis for coastal erosion



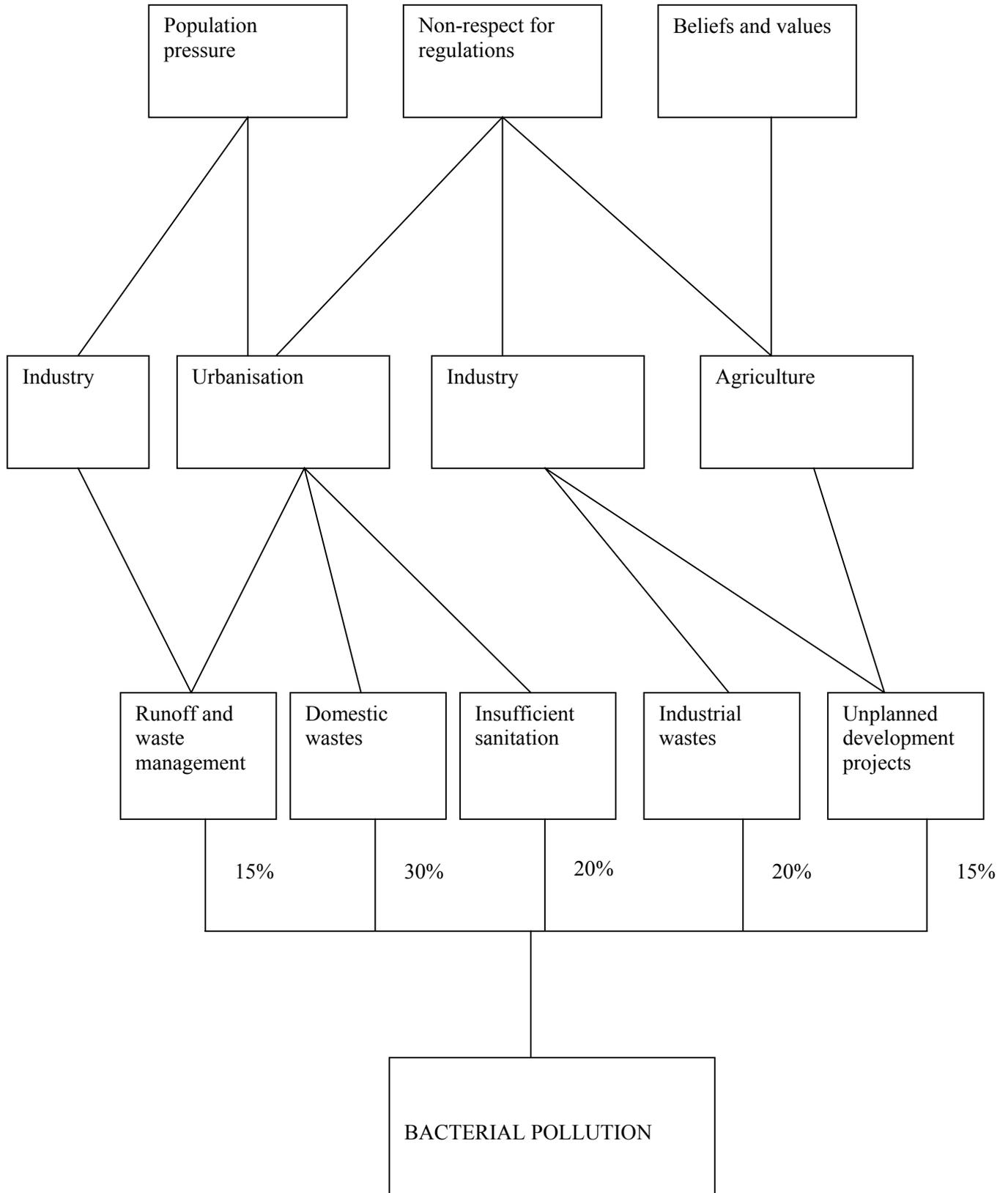
## II. POLLUTION

Fig. 4 Diagram representation of causal chain analysis for eutrophication issue

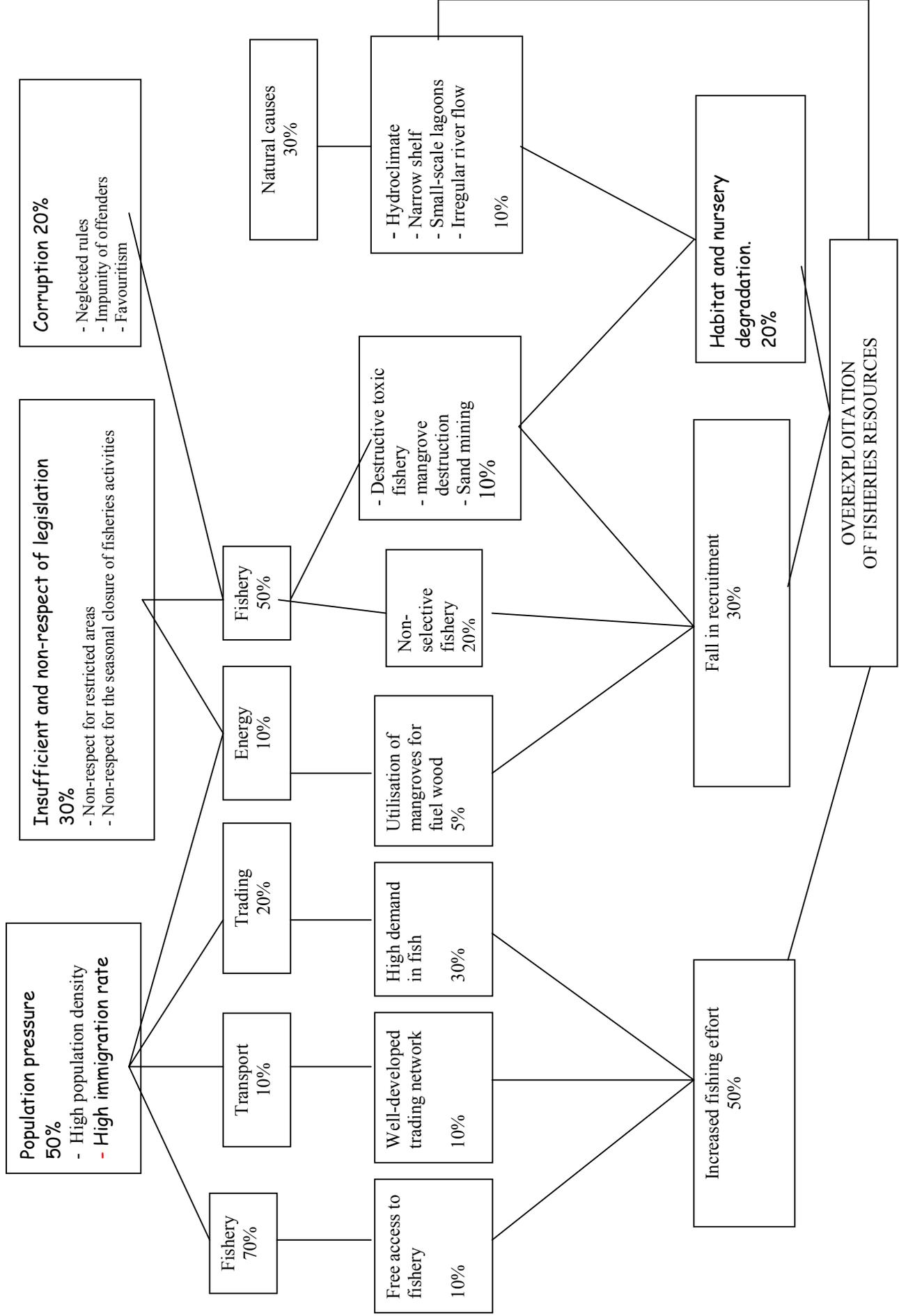


## II.2 BACTERIAL POLLUTION

Fig. 5 Diagram representation of causal chain analysis for bacterial pollution



**Fig. 6 Diagram representation of causal chain analysis for overexploitation of fisheries resources**



## CONCLUSION

In Côte d'Ivoire, areas of the coastal zone most affected by degradation and pollution are the mangrove ecosystem and lagoons, which serve as important spawning and nursery grounds for many fish and species and also help to protect the coastal from erosion.

The lagoons are the most threatened because of their closed nature and poor water exchange. Example is the Ebrié lagoon where water quality is poor and in many places, bacteriologically unsafe for primary human contact. In these areas threats to public health as a result of disease transmission are highest.

In the absence of adequate information, prioritisation of environmental problems may be difficult. However, it is noteworthy that sewage and solid domestic origin and their effects on public health are the highest priority. Habitat degradation, especially coastal erosion, leading to loss of coastal infrastructure is also a major problem. Of secondary importance are declining fishery resources, declining water quality and discharge from industrial operations.

Responses to control and minimize degradation of critical habitats pollution and also the declining of fishery resources is based on NEAP. Several institutions have been involved in various aspects of coastal area development and management. Some legislation exists but problems arise with implementation and enforcement. Local and municipal councils and private sectors have also been involved in coastal zone management. The capacity for action has, however, not been strong. Constraints have arisen as a result of inadequate finance, skilled manpower and equipment.

Financial and technical assistance are required to control coastal degradation. Assistance is required for institutional capacity building, human resources development and for procurement of cleaner technologies in waste management.

## RECOMMENDATIONS

ISSUES	RECOMMENDED ACTIONS
MANGROVES	Survey the mangrove ecosystems in the country to determine level of degradation through land-based activities. Promote public awareness with the local communities about mangrove degradation and restoration.
POLLUTION	Identification of sources, types and quantities of industrial and domestic wastes. Monitoring of water quality parameters. Analysis of fish to identify contaminant loading and pollution stress.
OVER-EXPLOITATION	Inventory of fish and other organisms to quantify biodiversity.
COASTAL EROSION	Strengthen regional co-operation. Build a national team of experts to control the issue. Encourage the implementation of the national Coastal Zone Management Project.
GENERAL RECOMMENDATIONS	Build a network of scientific and monitoring institutions equipped for monitoring and assessment in West Africa. Training of scientific and technical personnel to carry out monitoring and assessment programme. Development of regional environmental information system.

## **The National Report of the Gambia**

### **Slide 1**

GEF Project on 'Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa'

Third meeting of the Working Group on Integrated Problem Analysis (WGIPA-III)

10 – 11 September 2001

Cape Town, SOUTH AFRICA

### **Slide 2**

Overview

THE GAMBIA

National Report

### **Slide 3**

INTRODUCTION

- General
  - Geography /Demography
  - Economic Indicators
- The coastal zone
  - Scope
  - Hotspots/ Sensitive areas
  - Overriding Issues
  - Priority Issues
- Recommendations

### **Slide 4**

Map of the Gambia

Geography/Demography

- Location- latitude 13 and 14 degrees N
- Coastline -81 km
- Area - 11300km<sup>2</sup>
- Rainfall- 850-1200mm/year
- Population-1.038million( 4.2% growth rate)
- Population density-96 person/km<sup>2</sup>

## **Slide 5**

### Economic Indicators

- GDP - D3.833million(1US\$ = D15.00)
- the Economy
  - Agriculture 70% labor, 22% GDP
  - Tourism 10% labor, 6.25% GDP
  - the industrial sector < 2% labor, 6% GDP
  - Fisheries 5% labor 6%GDP

## **Slide 6**

### Scope of Coastal Area

- The Atlantic Coast
  - Alahein to Cape
  - Banjul Island
  - Tambi Wetland Complex
  - Tanji Bird reserve & Bijol Island

## **Slide 7**

### Scope of Coastal Area

- Western Part Of the river Gambia
  - Bitang Bolong
  - Nuimi National Park

## **Slide 8**

### Hotspot

- Tambi Wetland complex
- Nuimi Natinal Park
- River Tanji Bird Reserve
- Bitang Bolong

## **Slide 9**

### Sensitive Areas

- Alahein to Cape
- Banjul Island
- Western Part Of River Gambia

## Slide 10

### Overriding Issues

- Over Exploitation Of Natural Resources
- Coastal Erosion
- Waste Management

## Slide 11

### Priority Issues

- Lost / modification of ecosystem and ecotones
- Over exploitation of Fisheries and other resources
- Solid Waste Management

## Slide 12

<b>Future Changes Table</b>		<b>Country</b>			
<b>Major Concern</b>	<b>Issue</b>	<b>Average total score per Issue (A)</b>	<b>Average Score of Perceive future Changes (B)</b>	<b>Total Score A+B</b>	<b>Final Ranking of the Issues</b>
<b>1. Freshwater Shortage</b>	1	3	+2	5	
	2	4	+1.5	5.5	
	3	3.5	+1	4.5	
	5	2	0	2	
	6	2.7	0	2.7	
	7	3.6	1	4.6	
	8	5	+2	7	fourth
<b>III Habitat and Community Modification</b>	11	2.5	+1.7	4.2	
	12	5.2	+2.6	7.8	second
<b>IV. Unsustainable exploitation of fisheries &amp; other</b>	13	3.2	+3	6.2	
	14	5	+2.6	7.6	third
	15	2	+2.5	4.5	
	16	5.5	+2.5	8	first
<b>V. Global Change</b>	18	3	+2	5	
	19	3.7	+1.3	5	
	20	4.7	+1.8	6.5	fifth

## Slide 13

### RECOMMENDATIONS

- There is need for awareness creation particularly at the local level on the significance of the existence and proper management of coastal resources
- There is need for the continuous generation of information on coastal resources particularly socio-economic and scientific data
- At the National level, there should be an integrated and proactive approach to coastal resource management
- At the regional level there needs to be a concerted effort and cooperation in protecting and managing our coastal resources
- There is need for capacity building at national level (scientists and technicians ) to ensure the efficient management of the coastal resources

## The National Report of Ghana

### Assessment Of Impacts and Causal Chain Analysis - Ghana

Coastline: 565km  
East Coast: 149km  
Central Coast: 321km  
West Coast: 95km

#### Socio-Economic Characteristics

25% of Ghana's population lives in the coastal Zone(CZ).

Over 70% of industries in Ghana are located in the CZ.

Over 60% of fish catches are from marine fishing.

Economic activities: salt mining, vegetable farming, coconut plantation, quarrying, tourism and recreation, industries (textiles, food and drinks, plastics, wood processing, paper products, chemicals, petroleum refining, cement, etc).

Total Gross District Product (G.Di P) of CZ (based on 1994 estimates).

	<u>USD(million)</u>
Agriculture	: 453
Fisheries	: 54
Industry	: 317
Other	: 516

Total USD 1,340 million

Heritage Sites: forts and castles, Bird Sanctuaries, Ramsar sites.

Coastal Habitats & Biodiversity: estuarine wetlands, lagoons, lagoonal depressions and marshes, sandy shores, rocky shores and pools.

#### Identification of Hot Spots, Sensitive Areas and Overriding Issues

Hot Spots:

- Tano-Aby-Ehi Lagoon Complex;
- Korle Lagoon;
- Chemu Lagoon (Tema);
- Ada Foah Coastal Stretch;
- Keta Lagoon Complex; and
- Sakumo I Wetlands.

Sensitive Areas:

- Ada Sandy Beach/Volta Estuary/Anyanui Mangrove Wetlands;
- Songor Lagoon;
- Djangé Lagoon;
- Eture Wetlands/Elmina Salt Pans; and
- East Central sandy Beach (Kpone to Akplabanya).

Overriding Issues:

- solid waste (sanitation);
- wetlands degradation; and
- destructive fishing practices.

These overriding issues are also observed across the entire marine and coastal environment in West and Central Africa.

### **Scaling: Prioritisation of Hot Spots and Sensitive Areas**

Hot Spots:

- Keta Lagoon Complex;
- Sakumo I Wetlands; and
- Korle Lagoon.

Sensitive Areas:

- Songor Lagoon;
- East Central Sandy Beach(Kpone to Akplabanya); and
- Ada/Volta Estuary/Anyanui Mangrove Wetlands.

Overriding Issues:

- solid waste;
- modification of ecosystems or ecotones(wetland degradation); and
- destructive fishing practices.

### **Identification of Relevant GIWA Issues**

Based on the criteria for rating hot spots and sensitive areas, the team initially identified the following nine priority issues:

- reduction in streamflow;
- microbiological pollution;
- chemical pollution;
- solid wastes;
- modification of ecosystems or ecotones, including community structure and/or species composition;
- over-exploitation;
- destructive fishing practices;
- coastal erosion; and
- encroachment/Human Settlement.

### **Scoring of Issues**

1. Modification of ecosystems or ecotones, including community structure and/or species composition.

2. Reduction in streamflow
3. Microbiological pollution
4. Over-exploitation
5. Solid waste
6. Destructive fishing practices and
7. Chemical pollution

### **Establishing Linkages Between Ranked issues and Hot Spots/Sensitive Areas**

To establish linkages between the three most critical issues and sites, the team considered the three hot spots and three sensitive areas (identified at the scoping phase) to which each of the ranked issues apply. The hot spots or sensitive areas with the highest combined environmental and socio-economic scores from scoping phase were selected for each of the three ranked issues above. The selected sites and the related issues are:

- Sakumo I Wetland;
- Korle Lagoon; and
- Ada/Volta Estuary/Anyanui Mangrove Complex.

### **Overview of Selected Sites**

<u>Site</u>	<u>Overview of Problem</u>
Sakumo I Wetlands	Wetland integrity at risk
Korle Lagoon	Industrial & municipal pollution of coastal (lagoon rendered unproductive and aesthetically unattractive)
Ada/Volta Estuary/Anyanui	Wetland integrity at risk; loss of infrastructure; increased incidence of bilharzia

### **Constraints**

A major constraint in carrying out the study was the lack of data and peer-reviewed publications on the hot spots and sensitive areas. There appears to be no systematic or routine monitoring for data collection from the sites of interest to the study. Available data are mainly from project reports, environmental impact assessment reports and from research work by individuals. The lack of the relevant data and information greatly slowed down the study.

### **Environmental Impacts**

#### Modification of Streamflow

Sakumo I Wetland:

- massive changes in biodiversity;
- changes in fish and shrimp species composition; and
- reduction in fish catches.

Korle Lagoon:

- pollution;
- changes in biodiversity including fish species and invertebrates (bivalves and leeches); and
- severe reduction in fish catches, leading to almost total destruction of fisheries.

Ada/Volta Estuary/Anyanui Complex:

- general re-shaping of the delta frontage;
- formation and growth of sand bars at mouth of estuary;
- restriction of flood discharge into sea and tidal flows into estuary; and
- siltation and blockage of channels inter-connecting estuary, lagoons and mangrove marshes.

### Modification of Ecosystems

Sakumo I Wetland:

- increased solid waste and high nutrient levels;
- low fish catches;
- reduction of bird biodiversity; and
- modification of benthic habitat, leading to gross changes in microfauna.

Korle Lagoon:

- loss of viable fish/shellfish population; and
- reduction in arrival rate of paleoartic birds.

Ada/Volta Estuary/Anyanui Complex:

- changes in biodiversity of fish and shrimp species;
- reduction in abundance of fish and clams;
- increase in range of *Bulinus* snails, which are vectors for schistosomiasis;
- proliferation of aquatic weeds (*Ceratophyllum*);
- degradation of mangroves;
- loss of fish nursery habitats; and
- loss of sea turtle nesting sites.

### Microbiological Pollution

Kole Lagoon:

- high levels of *E. coli* and *streptococci* contamination;
- contamination of fish caught in the near shore; and
- human diseases such as cholera, typhoid and ascariasis.

Sakumo I and Ada/Volta Estuary/ Anyanui Mangrove Complex:

- potential contamination of oyster and fish with associated human health impacts; and
- potential outbreak of paralytic shell fish disease.

## **Socio-Economic Impacts**

### Modification of Stream Flow

Impacts are reduced incomes, human health (e.g. Schistomiasis), displacement and loss of property from flooding, general low socio-economic well-being. These impacts cut across the selected sites.

### Modification of Ecosystems:

- loss of infrastructure (roads, settlements, houses, fish landing sites) from erosion;
- loss of incomes from fishing;
- loss of income from tourism; and
- cost of coastal protection works and restoration projects.

### Microbiological Pollution

The impacts are disease, human health impacts and possibly mortality from outbreak of diseases such as cholera and loss of productivity due to illnesses. These impacts are particularly severe in the Korle Lagoon catchment.

### **Trans-Boundary Issues:**

- disruption of sediment transport and balance leading to erosion;
- loss of spawning and breeding grounds for migratory stocks;
- (shrimps, turtles) due to modification of ecosystems and habitats;
- transportation of untreated sewage along the coast and in near shore waters by currents and long-shore drift; and
- over-fishing and unsustainable fishing practices have effects beyond territorial boundaries.

## **National Recommendations**

### Interventions to address modification of ecosystems and ecotones:

- solid waste and sewage management in Accra;
- sea defence structures and shoreline reclamation at Ada;
- integrated water resource management;
- wetland conservation programmes; and
- poverty alleviation programmes.

### Intervention to address modification of stream flow:

- regular dredging of the lower Volta to remove sandbars and improve drainage;
- afforestation programmes for the catchment areas to improve streamflow and reduce siltation;
- promote programmes to reduce water losses in abstraction and distribution; and
- poverty alleviation through alternative income generation for affected populations such as fishermen.

### Interventions to address microbiological pollution:

- provision of sanitation infrastructure;
- expansion of sewerage network and sewage treatment plants;
- human and institutional capacity building for development and regulatory activities;
- waste management in the catchment areas of the sites;
- poverty alleviation programmes; and
- integrated water resources management of the catchment areas.

### **General Project Ideas**

The following project ideas were derived from discussions on the causes and bottlenecks associated with the three main GIWA issues.

#### Sakumo 1 Wetland:

- conservation of Sakumo 1 wetland;
- management of solid waste within the entire catchment;
- provision of sanitation infrastructure;
- poverty alleviation programmes; and
- integrated water resources management for Sakumo 1 catchment.

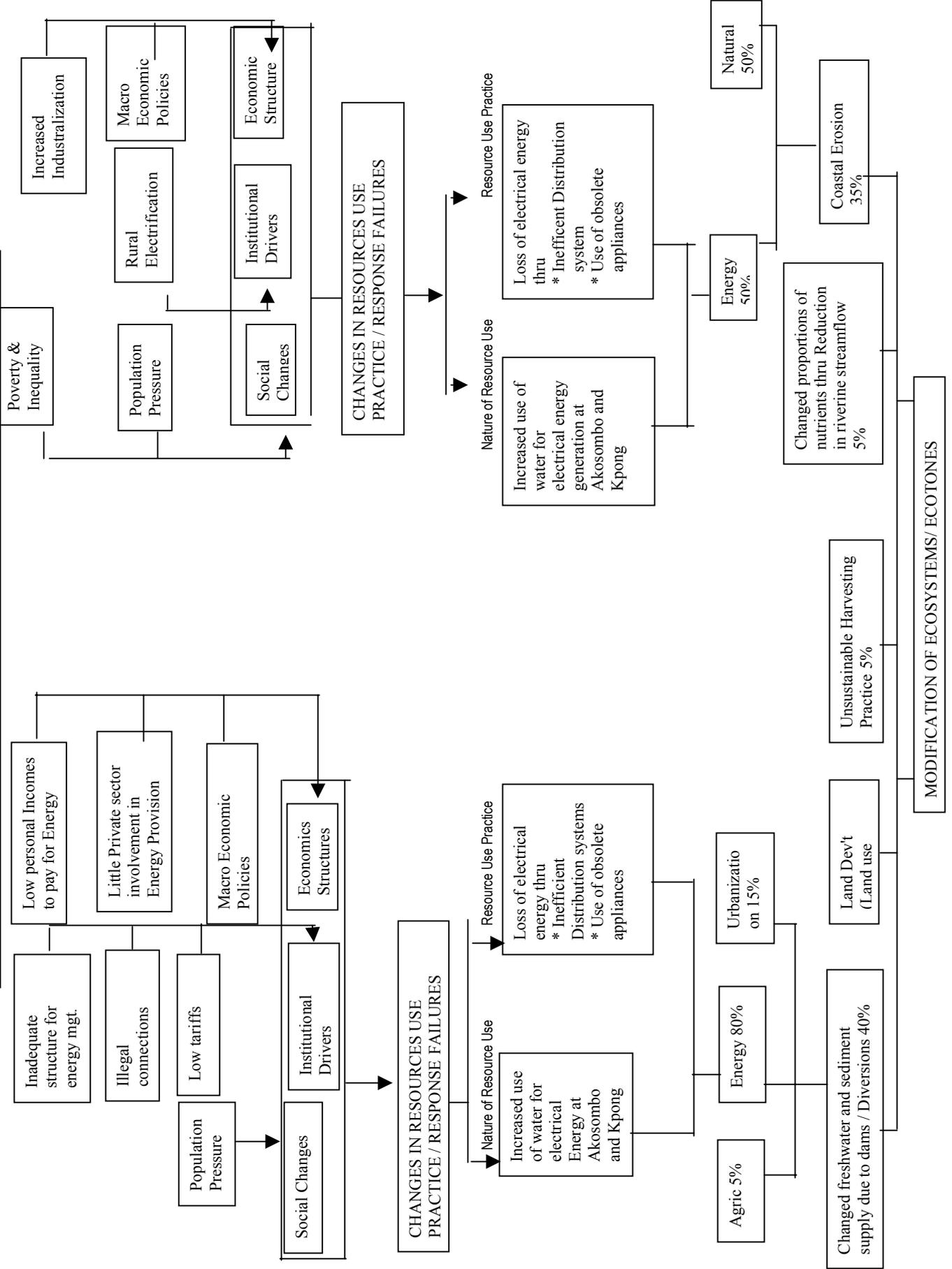
#### Korle Lagoon:

- management of solid waste within the entire catchment;
- provision of sanitation infrastructure;
- human and institutional capacity building for development and regulatory activities; and
- physical planning for Korle catchment.

#### Ada/Volta Estuary/Anyanui Mangrove Complex (AVEAMC):

- conservation of wetlands in AVEAMC;
- protection of the eastern coastline from erosion;
- improved channellisation and drainage of AVEAMC;
- biodiversity enhancement in the Lower Volta Basin; and
- water weed control in the Volta river.

# ADA/VOLTA ESTUARY/ANYANUI MANGROVE COMPLEX



## **The National Report of Mauritius**

### **Slide 1**

Development and Protection of  
The Coastal and Marine Environment  
in Sub-Saharan Africa

Mauritius  
R. Dulymamode  
M. Bhikajee  
V. Sannasse

### **Slide 2**

Hotspots, sensitive areas and overriding issues

- •6 sites (all being hotspots) selected out of 10
- •Flic en Flac
- •Grand Bay
- •Palmar-Belle Mare
- •Pointe aux Sables
- •Riambel-Pomponette
- •Rodrigues

### **Slide 3**

Selected sites in Mauritius

### **Slide 4**

Prioritisation of Issues

### **Slide 5**

Environment/Socio-economic Assessment

- Modification of ecosystems/ecotones
  - Destruction/reduction of habitats
  - Destruction/reduction of breeding grounds
  - Deterioration of water quality
  - Changes of water currents

- Shoreline Change
  - Destruction/loss of habitats
  - Loss of beach area
  - Reduction in beach protection
  - Aesthetic devaluation
  - Damages on infrastructure
- Over-exploitation
  - Destruction/loss of habitats
  - Deterioration of water quality

### **Slide 6**

Immediate Causes & Sectoral Pressures-Shoreline Change

### **Slide 7**

Immediate Causes & Sectoral Pressures-Over-exploitation

### **Slide 8**

Immediate Causes & Sectoral Pressures-Modification of ecosystems

### **Slide 9**

Commonalities

- Immediate Causes & Sectoral Pressures
  - Two major sectors contributing to immediate causes-urbanisation and industry (including tourism)
- Root Causes
  - Population Pressure
  - Little government commitment
  - Macro-economic policies
- Environmental Management and Sectoral policies
  - Land use changes
  - Water pollution policies
  - Failure to implement policies due to lack of resources
- Community responses sporadic
- Market responses
  - Incentives to tourist industry
  - Incentives to fishing community

## Slide 10

### Gaps

- Absence of clear understanding of natural phenomena
- Little economic evaluation of resources
- Lack of trained man power
- Absence of modeling and forecasting programmes
- Systematic monitoring of pollutants
- Lack of coherence and co-ordination
- Systematic monitoring of shoreline changes
- Fragmented legislations leading to jurisdictional overlaps

## Slide 11

### Recommendations 1/2

- Education & Training
  - Invest in training in relevant fields
  - Training of fishermen to adopt new technologies and basic conservation
  - Encourage community participation through education programmes
- Research
  - Undertake systematic long term studies to monitor pollution, shoreline changes and on conservation of marine biodiversity
  - Develop, test and study the effectiveness of remedial measures against coast line erosion
  - Carry out economic evaluation of resources and socio-economic studies on the impacts of coastal urbanisation and rapid tourism development on the coastal zone
  - Develop modeling and forecasting programmes for ecological and socio-economic issues

## Slide 12

### Recommendations 2/2

- Review of legislations to
  - decrease overlap and assign responsibilities
  - give the NPDP the legal back-up
  - render enforcement more effective
  - reinforce co-ordination between stakeholders
  - address the weaknesses of the EIA process
- Infrastructure
  - Strict zoning for development
  - upgrading and development of sewerage network and treatment plants
- Other policies
  - Adopt clean technologies
  - Prepare and implement ICZM

## **The National Report of Mozambique**

### **Environmental Problem Analysis - Mozambique**

#### **Slide 1**

Environmental problem analysis Mozambique

- The team that carried this assignment:
  - Dr. Antonio Mubango Hogueane
  - Mrs. Helena Motta
  - Mrs. Zelia Menete
  - Mr. Simeao Lopes

#### **Slide 2**

Environmental problem analysis Mozambique

- General Socio-economic conditions of Mozambique:
  - 16x10<sup>6</sup> inh (coastal density = 40inh km<sup>-2</sup> )
  - GDP =USD220
  - Main sectors of economy:
    - Fisheries
    - Agriculture and forestry
    - Tourism
    - Transports and communication

#### **Slide 3**

Environmental problem analysis Mozambique

- General Environmental conditions of Mozambique:
  - Climate - Tropical humid
  - 2,700 km of coastline (parabolic dunes, swampy/alluvial and coral/rock cost)
  - Various and diverse ecosystems (corals, mangroves, seagrass)
  - Relatively preserved habitats
  - Abundant natural resources (forestry, wildlife, marine, water)

#### **Slide 4**

Environmental problem analysis Mozambique

- Major sites of concern:
  - 1 HOT-SPOTS - Are associated with large cites or/and high development activities
    - Maputo Bay (harbour, tourism, industry, fishing)
    - Sofala Bank (harbour, fishing)
    - Nacala and Mozambique Island (harbour, world heritage)

## Slide 5

Environmental problem analysis Mozambique

- Major sites of concern:
  - 1 SENSITIVE AREAS - Associated with overexploitation, use of inadequate harvesting practices and future development trends (mainly tourism and fishing)
    - Inhaca and Matuituine
    - Bazaruto Arquipelago
    - Marromeu and Zambezi Delta
    - Quirimba Arquipelago

## Slide 6

Environmental problem analysis Mozambique  
(Map)

## Slide 7

Environmental problem analysis Mozambique

- Major environmental issues:
  - Overfishing (Overriding)
  - Destructive fishing practices (Overriding)
  - Loss and modification of ecosystems (Overriding)
  - Modification of stream flow

## Slide 8

Environmental problem analysis Mozambique

- Major environmental impacts:
  - Loss of habitats (e.g. erosion, mangroves)
  - Reduction in fish stocks
  - Deterioration of water quality (e.g. salt intrusion)
  - Loss of biodiversity (e.g. endangered species)
  - Loss of aesthetic value

## Slide 9

Environmental problem analysis Mozambique

- Major socio-economy impacts:
  - Reduced income
  - Loss of employment opportunities
  - Reduced options of subsistence of the community
  - Conflicts between resource users
  - Loss of aesthetic and cultural values

## **Slide 10**

### Environmental problem analysis Mozambique

- Major Transboundary impacts - Are associated with shared resources and endangered species:
  - Conflicts in managing shared rivers
  - Conflicts in managing shared fish resources
  - Loss of biodiversity (e.g. endangered species, migratory species)
  - International prices of fish products affected

## **Slide 11**

### Environmental problem analysis Mozambique

- Major immediate causes of the environmental problems:
  - Increased demand in resources use
  - Lack of adequate means of exploitation
  - Inadequate management measures
  - Lack of knowledge/capacity for developing adequate management strategies
  - Natural processes (global climate change)

## **Slide 12**

### Environmental problem analysis Mozambique

- The proposed projects aim at:
  - Building capacity for a better understanding of the ecosystem structure and functioning ( through research/monitoring) as to enable adoption of better management measures
  - Maintaining the ecosystems health
  - Maintaining the biodiversity

## **Slide 13**

### Environmental problem analysis Mozambique

- The proposed projects aim at:
  - Reducing pressure over the resources and store the fish stocks overexploited
  - Diversifying the income generating activities and Increase the income of the local community
  - Promoting sustainable development

## **The National Report of Nigeria**

### **Report of the Nigerian Integrated Analysis Component**

#### **Slide 1**

GEF MSP SUB SAHARAN AFRICA PROJECT  
DEVELOPMENT AND PROTECTION OF THE COASTAL AND MARINE ENVIRONMENT IN  
SUB-SAHARAN AFRICA

By

Larry Awosika --- National Coordinator

Niyi Osuntogun --- National Expert

Emmanuel Oyewo --National Expert

Akin Awobamise --- National Expert

SEPT 2001

#### **Slide 2**

(Map)

- Barrier lagoon coast
- Mahin mud coast
- Niger Delta coast
- Strand coast

#### **Slide 3**

NIGERIAN CONTINENTAL SHELF

(Map)

#### **Slide 4**

RESOURCES

- OIL AND GAS
- BEACHES
- FISH AND SHELLFISH
- NION FUEL MINERALS e.g. SAND
- MANGROVE COMMUNITITES
- WETLANDS
- FOREST

## **Slide 5**

### IDENTIFICATION AND CHARACTERIZATION OF HOTSPOTS, SENSITIVE AREAS AND OVERRIDING ISSUES

#### USE OF EXPERT OPINION

(Map)

- (A) Barrier- Lagoon Coast
- Badagry to Lagos
- Lagos to Lekki
- Lekki to Kusemeta
- (B) Mahin Mud Coast
- Kusemeta to Benin River
- Niger Delta
- Benin River Mouth to Ramos River mouth
- Ramos River mouth to Nun River mouth
- Nun River mouth to Imo River mouth
- (D) Strand Coast
- Imo River mouth to Qua Iboe River mouth
- Qua Iboe River mouth to the Nigerian Cameroon Border

## **Slide 6**

### EXPERT OPINION

(Map)

- HOT SPOTS
  - Awoye/Molume
  - Lagos Islands
  - Ogoni Land/Port Harcourt Area
- SENSITIVE AREAS
  - Ibeno Eket Area
  - Ramos River to Nun River
  - Nun River to Imo River mouth

## **Slide 7**

### MODIFIED GIWA METHODOLOGY

(Map)

- HOT SPOT
  - Lagos Islands
  - Ogoni-Land/Bonny Area
  - Eket Area

- SENSITIVE AREAS
  - Akassa/Brass/SantaBarbara River Areas
  - Barrier Island between Dodo & Nun Rivers
  - Opobo area

### **Slide 8**

#### IDENTIFICATION OF KEY CONCERNS

Based on the applicability of GIWA methodology for both HSs and SAs, the key concerns were:

- i) Pollution
- ii) Habitat/Community modification
- iii) Global Change
- iv) Over exploitation of fishery resources

### **Slide 9**

#### POLLUTION

(Photographs)

- OIL SPILL
- SOLID WASTE
- SEWAGE

### **Slide 10**

#### MODIFICATION OF ECOSYSTEM

(Photographs)

### **Slide 11**

#### MODIFICATION OF ECOSYSTEM

#### MANGROVE DEFORESTATION

(Photographs)

### **Slide 12**

#### OVEREXPLOITATION OF FISHERY RESOURCES

- ARTISANAL FISHERIES
- TRAWLERS- INDUSTRIAL
  - WRONG MESH SIZES
  - DYNAMITE
  - POACHING

**Slide 13**

CAUSAL CHAIN ANALYSIS FOR SPILLS: (HOTSPOT)

**Slide 14**

NATION WIDE CAUSAL CHAIN ANALYSIS FOR OVER-EXPLOITATION IN NIGERIA

**Slide 15**

MODIFICATION OF ECOSYSTEM

**Slide 16**

CAUSAL CHAIN ANALYSIS FOR SOLID WASTES: LAGOS ISLANDS (HOT-SPOT) NIGERIA

**Slide 17**

NATION - WIDE CAUSAL CHAIN ANALYSIS FOR OVER-EXPLOITATION IN NIGERIA

**Slide 18**

CONCLUSIONS  
NIGERIAN COASTAL ZONE DEGRADED

- IMPACTS ON SOCIO-ECONOMIC ACTIVITIES
- OVER POPULATION
- INCREASED PRESSURES ON RESOURCES
- INTERVENTIONS

PROJECT PROPOSAL-CONCEPT

**Slide 19**

POLLUTION  
OIL SPILL:

- Remediation
- Monitoring
- Reception facilities at ports
- Capacity building for spill management and Tech acquisition

## SOLID WASTE

- Waste minimisation strategies
- Collection and disposal techniques
- Waste to wealth/recycling
- Environmental sound disposal methods

## SEWAGE

- Low cost tech for management
- Monitoring

### **Slide 20**

## MODIFICATION OF ECOSYSTEM

- Mangrove restoration
- Nepa palm project
- Erosion control
- Coastal processes monitoring and modeling
- Public enlightenment

### **Slide 21**

## CLIMATE CHANGE

- Inventorisation of Greenhouse gases
- Development of National Climate Change plan of action
- Protection from flooding and erosion from SLR

### **Slide 22**

## OVER EXPLOITATION OF FISHERIES RESOURCES

- Fisheries stock assessment
- Development of aquaculture
- Legal instruments-Fishing regulations and enforcement
- Environmental parameters
- Public enlightenment

### **Slide 23**

## THANKS FOR THE BASKET

## **The National Report of Senegal**

### **Preliminary Results - Senegal**

#### **Slide 1**

SENEGAL : Preliminary results  
Isabelle NIANG-DIOP  
University Cheikh Anta Diop  
Dakar  
SENEGAL

#### **Slide 2**

STEP 1 : Identification of Hots spots and Sensitive areas  
Issues prioritization

- HOT SPOTS
  - Djoudj National Park : Sénégal delta, Bird reserve, Ramsar site, invasive species
  - Hann bay : close to Dakar, important pollution of coastal waters
  - Djiffere : on the Sangomar sand spit, coastal erosion

#### **Slide 3**

STEP 1 : Identification of Hots spots and Sensitive areas  
Issues prioritization

- SENSITIVE AREAS
  - Sénégal delta : modification of stream flow, daming
  - Saloum estuary : reverse estuary, modification of mangroves
  - Casamance estuary : reverse estuary, modification of mangroves

#### **Slide 4**

STEP 1 : Identification of Hots spots and Sensitive areas  
Issues prioritization

- MAIN ISSUES
  - 1. Modification of stream flow
  - 2. Modification of ecosystems : mangroves, coastal erosion, fish populations
  - 3. Chemical pollution

#### **Slide 5**

STEP 2 : Impacts assessment  
Issue 1 : Modification of stream flow  
INVERSE ESTUARIES (Saloum, Casamance)

- Environmental impacts

- Soil salinization : sulfato acid soils
- Salinization of aquifers
- Modifications of flora and fauna: degradation of the mangrove, trend to monospecific populations, extension of marine species in estuaries

### **Slide 6**

STEP 2 : Impacts assessment

Issue 1 : Modification of stream flow

INVERSE ESTUARIES (Saloum, Casamance)

- Socio-economic impacts
  - Water scarcity
  - Less fertile soils available
  - Decrease in estuarine fisheries landings
  - More salt exploitation

### **Slide 7**

STEP 2 : Impacts assessment

Issue 1 : Modification of stream flow

ARTIFICIAL ESTUARY (Sénégal)

- Environmental impacts
  - Downstream of the dam, stress on species due to very rapid changes in salinity; soil salinization, death of fishes;
  - Upstream of the dam, expansion of invasive species (Pistia, Salvinia), disparition of estuarine species, higher lake levels, presence of *Bulinus guernei*

### **Slide 8**

STEP 2 : Impacts assessment

Issue 1 : Modification of stream flow

ARTIFICIAL ESTUARY (Sénégal)

- Socio-economic impacts
  - Outbreak of intestinal bilharsiosis and development of other parasitoses as well as malaria
  - Reparition of livestock diseases
  - New conflicts for the land use
  - More water availability (drinking water, irrigation)

### **Slide 9**

STEP 2 : Impacts assessment

Issue 12-13 : Modification of ecosystems

Sandy beaches : Coastal erosion

- Environmental impacts

- death of mangrove
- huge sand accumulations
- retreat of oceanic beaches
- reduction of species in the new mouth

### **Slide 10**

STEP 2 : Impacts assessment  
 Issue 12-13 : Modification of ecosystems  
 Sandy beaches : Coastal erosion

- Socio-economic impacts
  - destruction of one fishing factory
  - communication problems
  - displacement of a tourist camp
  - new tourism opportunities

### **Slide 11**

STEP 2 : Impacts assessment  
 Issue 6 : Chemical pollution

- Environmental impacts
  - Reduction in the water quality
  - Proliferation of algae and eutrophication
  - Decrease in specific richness of the benthos
  - Contamination of fishes (demersal first), strong reduction of species and number

### **Slide 12**

STEP 2 : Impacts assessment  
 Issue 6 : Chemical pollution

- Socio-economic impacts
  - increase of diseases (cholera, )
  - reductions in the use of water
  - more important displacement for fishermen
  - no attraction for the fish market and difficulties to sell polluted fishes (mullet)

### **Slide 13**

STEP 3 : Causal Chain Analysis  
 (Chart)

### **Slide 14**

STEP 3 : Causal Chain Analysis  
 (Chart)

### **Slide 15**

STEP 3 : Causal Chain Analysis  
(Chart)

### **Slide 16**

STEP 3 : Causal Chain Analysis  
(Chart)

### **Slide 17**

STEP 3 : Causal Chain Analysis  
(Chart)

### **Slide 18**

STEP 3 : Causal Chain Analysis  
(Chart)

### **Slide 19**

STEP 3 : Causal Chain Analysis  
Root Causes

- Social changes
  - Population pressures, urbanization
  - Poverty
- Institutional drivers
  - Lack of control
  - Non implementation of laws
  - Multiplicity of governmental actors

### **Slide 20**

STEP 3 : Causal Chain Analysis  
Root Causes

- Economic structure
  - Sectoral policies
  - Debt pressure
  - Economy oriented towards exportation
  - Little engagement of private sector

## **The National Report of Seychelles**

### **Summary of National Report - Seychelles**

#### **Slide 1**

SEYCHELLES  
Summary of National Report

#### **Slide 2**

(Map)

#### **Slide 3**

Identification of Hot Spots, Sensitive Areas and Overriding Issues

##### Hot Spots

3 on Mahe

2 on Praslin

1 on La Digue

##### Sensitive Areas

3 on Mahe

2 on Praslin

1 coralline island (Cosmoledo Atoll)

#### **Slide 4**

##### Overriding Issues

Pollution

Habitat and community modification

Global change

#### **Slide 5**

Scaling : Prioritisation of Hot Spots and Sensitive Areas

##### Hot Spots

The Coastal Plateau of La Digue

The East Coast, Mahe

Anse Volbert, Praslin

##### Sensitive Areas

Port Launay and Baie Ternay Marine Parks (and adjacent areas)

Cosmoledo Atoll

Mahe Wetlands

#### **Slide 6**

Scoping : Prioritisation of Issues (1)

##### HOT SPOTS

- Freshwater Shortage (lowering of water table)
- Pollution (microbiological, chemical, suspended solids, solid wastes, spills and eutrophication)
- Habitat and Community Modification (modification of ecosystems or ecotones, loss of habitat); and
- Global change (sea level rise)

### **Slide 7**

Scoping : Prioritisation of Issues (2)

#### SENSITIVE AREAS

- Pollution (eutrophication)
- Habitat and Community Modification (modification of ecosystems or ecotones, loss of habitat)
- Unsustainable Exploitation of Fisheries and Other Living Resources (over-exploitation, impact on biological and genetic biodiversity); and
- Global Change (Sea level rise, changes in hydrological cycle)

### **Slide 8**

Scoping : Prioritisation of Issues (3)

#### OVERRIDING ISSUES

Pollution (Eutrophication);

Habitat and Community Modification (Modification of ecosystems and ecotones)

Global Change (Sea level rise)

### **Slide 9**

Scoping : Prioritisation of Issues (4)

#### Ranking of Issues taking account of perceived future changes

- Modification of Ecosystems or Ecotones;
- Sea Level Rise
- Loss of Ecosystems or Ecotones;
- Coral Bleaching

### **Slide 10**

#### Assessment of Environmental and Socio economic Impacts

- Habitat and Community Modification
- Global Change

## Slide 11

### Modification and/or loss of ecosystems or ecotones

Modification of biodiversity, including loss of species and genetic diversity;  
Modification in natural storm barriers

## Slide 12

### Modification of Biodiversity (1)

Endemic Species and Vegetation

- Rare species due to small size of islands & limited range;
- Habitat destruction – resulting in further fragmentation of habitats;
- Introduction of animal species – a major cause for rarity of invertebrates;
- Human predation – has declined;
- Habitat loss resulting from social development & tourism – especially on the granitic islands

## Slide 13

### Modification of Biodiversity (2) Invasive Species

Introduced plant species, where they are invasive, are a major threat in the granitic islands of Seychelles, particularly in the remaining areas of high altitude forest.

Some species also pose a threat to biodiversity in coastal areas, including areas such as the La Digue Plateau and wetlands on Mahe.

Introduction of species such as rats and cats has also been a significant factor on many islands, particularly for a number of rare bird species

## Slide 14

### Modification in Storm Barriers (1)

- Removal of marshes & mangroves which acted as storm barriers
- Pressures further increased by deforestation and construction on hillsides – leading to erosion & leaching of red soils & to over-siltation of wetlands
- Invasive species in freshwater wetlands
- Diversion of water courses leading to insufficient throughput of water to wetlands

## Slide 15

### Modification in Storm Barriers (2)

- Rapid socio-economic development has increased the pressures, as scarcity of flat land has led to extensive reclamation of reef flats. As coral rubble is used as fill – consequent loss of all shallow marine habitats in the vicinity

- And increase in beachfront developments (housing, tourism) resulting in removal of coastal vegetation, thus increasing vulnerability of beaches to sand erosion

### **Slide 16**

#### Socioeconomic Impacts (1)

- Modification of Ecosystems – has always been significant in Seychelles’ development
- Land reclamation – extensively practiced
- Immediate socio-economic impacts – improved infrastructure for tourism, housing and recreation, and more job opportunities
- No direct negative socio-economic impacts on any groups

### **Slide 17**

#### Socioeconomic Impacts (2)

- Increased costs of management of “modified habitats”
- Threat of sea-level rise – adds to costs
- Impacts on biodiversity are not purely ecological issues, as biological resources are the base on which national prosperity is built – tourism and fisheries
- Biological resources also provide indirect values – i.e. as a sink for wastes & residues, and in protection to beaches and watersheds

### **Slide 18**

#### Socioeconomic Impacts (3)

- Lost production and consumption opportunities through the direct use of biodiversity resources (i.e. fishing and tourism)
- Expenditure to prevent or mitigate effects of damage to resources and ecosystems
- Replacement of lost or depleted biological resources
- Costs of future economic opportunities foregone (i.e. future tourism development)

### **Slide 19**

#### Socioeconomic Impacts (4)

The cost mitigating & protecting Seychelles’ ecosystems includes:

- The cost of foregoing or diminishing unsustainable activities
- The costs of replacing and/or adapting technologies that negatively impact on the environment
- The direct physical costs of biodiversity management & protection

## Slide 20

### Global change

In the study of impacts, 3 issues were identified as being of particular importance, namely:

- Saltwater intrusion to freshwater aquifers
- Modification of habitats, as a result of coral bleaching
- Loss of habitats & damage to coastal zones including productive land as a result of coastal erosion

## Slide 21

### Socio-economic Impacts of global change

#### Direct Impacts

- Coastal erosion
- Salination of the coastal plateau
- Damage to coastal infrastructure

#### Indirect Impacts

- Loss of tourism revenue
- Reduced fisheries resources
- Costs of protection measures

## Slide 22

### Causal Chain Analysis

Modification and loss has occurred as a result of:-

- Land use conversion
- Extraction of sand and gravel
- Changes in sand deposition
- Sedimentation flow resulting from agriculture and new housing construction
- Pollution (eutrophication)
- Dumping of wastes
- Introduction of alien species
- Extraction of species
- Global change

## Slide 23

### Modification & Loss of ecosystems

#### Immediate Causes

- Land development (land use changes), associated with urbanisation & tourism

- Changed freshwater & sediment supply
- Land reclamation & associated dredge spoil activities
- Reclamation of land from the sea for the purpose of waste disposal

#### **Slide 24**

Environmental management policies and tools

- Town & Country Planning Act (1974) – TCPA
- Environmental Protection Act (1994) – EPA
- Environmental Management Plan of Seychelles (1990-2000) & (2001-2010)
- Plan d’Amenagement du territoire (PAT)

#### **Slide 25**

Sectoral Pressures

Urbanisation / Tourism / Fisheries

Leading to significant land use changes / conversion  
(including reclamation)

#### **Slide 26**

Root Causes (1)

Social Change

- Population pressure and demographic change
- Social Development
- Beliefs and Value Systems

#### **Slide 27**

Root Causes (2)

Institutional Drivers

- Government commitment to socio-economic development
- Limitations of centralized system of Government
- Limited civil society empowerment

#### **Slide 28**

Root Causes (3)

Economic Structure

- Small Size of Domestic Economy and Lack of Economic Diversification
- Development Model and socio-economic policies

## **Slide 29**

### GLOBAL CHANGE

#### (1. Coral Bleaching)

##### Immediate Causes

- Large-scale “global threats” (70% of the pressure) that have resulted in an increase of sea temperatures;
- Local threats (totaling an estimated 30% of the pressure), especially sediment discharge, sedimentation from reclamation activities & local increase in seawater temperature.

## **Slide 30**

### 2. Coastal Erosion

#### Global Pressures

- Sea level rise (30%)
- Increased wave intensity (20%)
- Abnormal high tides (5%)

#### Local Pressures

- Marine Structures built along the coast (15%)
- Beach and sand mining; (10%)
- Land use change (5%)
- Reclamation (5%)
- Changed freshwater & sediment supply (5%)
- Channels & passages across reefs (5%)

## **Slide 31**

### Sectoral Pressures

#### Coral Bleaching

- Industry (23%)
- Urbanisation (22%)
- Tourism (15%)
- Transport (14%)
- Agriculture (13%)
- Fisheries (8%)

### Coastal Erosion

- Urbanisation (30%)
- Tourism (22%)
- Industry (23%)
- Transport (13%)
- Fisheries (10%)
- Agriculture (8%)

### **Slide 32**

Environmental management policies & tools

#### 1. Coral Bleaching

- Designation & management of marine protected areas
- Need for Research & Monitoring Programmes, and Capacity Building

### **Slide 33**

Environmental management policies & tools

#### Coastal Erosion

- Stricter monitoring and enforcement of the relevant laws (e.g. Removal of Sand and Gravel Act)
- Measures to limit damage to sensitive dune areas (e.g. erection of barriers to parking, construction of boardwalks, replanting dune vegetation, etc.)

But need for more to be done – particularly in monitoring & enforcement & raising awareness

### **Slide 34**

Root Causes

#### Global Change

Coral Bleaching (70%) / Coastal Erosion (55%)

#### Local Causes

The local root causes of coral bleaching and coastal erosion – similar to those described for loss and modification of habitat.

### **Slide 35**

Gaps & Commonalities

#### GAPS

Critical Lack of Data, and Baseline Studies

#### COMMONALITIES

Impacts associated with socio-economic development

Specificities & vulnerabilities as a small island developing state

## **Slide 36**

### Commonalities in the causal chain

Among the recurring themes in the causal chain analysis were the issues of enforcement, and limited resources (financial and human). Although Seychelles boasts a wide and comprehensive range of laws and other instruments aimed at the protection and conservation of the environment, monitoring and enforcement is often a major problem.

## **Slide 37**

### Transboundary issues

- Global climate change and sea level rise
- Protection, conservation and management of globally endangered and endemic species

## **The National Report of Tanzania**

### **Causal Chain Report Analysis for Tanzania**

#### **Slide 1**

DEVELOPMENT AND PROTECTION OF THE COASTAL AND MARINE ENVIRONMENT IN  
SUB-SAHARAN AFRICA  
CAUSAL CHAIN REPORT ANALYSIS FOR TANZANIA

#### **Slide 2**

MAJOR ISSUES IDENTIFIED

- Loss/modification of ecosystems/ecotones
  - Coral reefs
  - Mangrove forests
  - Seagrass beds
- Destructive fishing practices
- Overexploitation of marine resources
- Microbial pollution

#### **Slide 3**

Causal Chain Analysis for Loss and Modification of Ecosystems: Coral Reefs (figure)

#### **Slide 4**

Causal Chain Analysis for Loss and Modification of Ecosystems: Mangroves (figure)

#### **Slide 5**

Causal Chain Analysis for Loss and Modification of Ecosystems: Seagrass Beds (figure)

#### **Slide 6**

Linkages between issues: destructives fishing practices and loss/modification (figure)

#### **Slide 7**

Causal Chain Analysis for Over-exploitation of Fisheries Resources (figure)

## **Slide 8**

### RECOMMENDATIONS TO ADDRESS:

- Loss and modification of ecosystems/ecotones
- Destructive fishing practices
- Overexploitation of marine resources
  - Provision of proper gear and vessels to fishermen's cooperatives
  - Establishment of alternative or supplementary income-generating activities for fishing communities.
  - Mobilization of communities against destructive fishing methods and illegal mangrove cutting.

## **Slide 9**

### RECOMMENDATIONS (CONTINUED)

- Introduction of the system of seasonal closure of reefs
- Increase efforts in restoration of coral reefs and mangrove forests with community participation
- EIA should be mandatory for any activities affecting the coastal and marine environment
- Planning and implementation of development projects should involve local communities so as to alleviate poverty and to take pressure off natural resources

## **Slide 10**

### RECOMMENDATIONS (CONTINUES)

- Greater enforcement of laws and regulations related to fishing practices

## **Slide 11**

Causal Chain Analysis for Microbial Pollution (figure)

## **Slide 12**

### RECOMMENDATIONS TO ADDRESS MICROBIAL POLLUTION

- Land-use planning should take into consideration sensitive ecosystems which are vulnerable to pollution. Sensitivity maps would be useful tools for zoning
- Develop and implement community-based activities and approaches that better incorporate local communities in the management process

## **Slide 13**

### RECOMMENDATIONS (CONTINUED)

- Creation of conducive environment for the establishment of Public – Private Partnership (PPP) in wastewater management
- Initiate and support a national water quality monitoring program
- An EIA should be conducted for any project that is initiated which may contribute to microbial pollution

## ANNEX IV

### Presentation of the Regional Consolidated Analysis

#### Slide 1

Development and Protection  
of the Coastal and Marine Environment  
in Sub-Saharan Africa  
REGIONAL CONSOLIDATED ANALYSIS

#### Slide 2

The Regional Analysis consolidates  
the 11 national reports, highlighting:

- Factors of commonalties
- Elements of transboundary
- Linkages between env. degradation and Sust. Dev.
- Particular cause-effect relationship

#### Slide 3

Not a comparison  
But critical evidence of common priorities and problems  
=> arguing for need for coherent, harmonized and cooperative approach

#### Slide 4

##### TABLE OF CONTENT

Background

Executive summary

##### 1. INTRODUCTION

- 1.1. Representativity of the countries
- 1.2 Status of the coastal and marine environment
- 1.3 Implementation of the methodology and suggested amendments

##### 1. SCOPING: KEY SITES AND ISSUES

- 1.1. Key sites selected
- 1.2 Key issues selected

##### 2. ASSESSMENT OF IMPACTS

- 2.1 Freshwater shortage or excess (floods)
- 2.2. Pollution
- 2.3. Loss and modification of ecosystem
- 2.4. Unsustainable exploitation of fisheries & other living resources
- 2.5. Global changes
- 2.6 Environmental degradation and the sustainable development processes

##### 3. CAUSAL CHAIN ANALYSIS

- 3.1. Changes in freshwater flow
- 3.2. Pollution
- 3.3. Loss and modification of habitats
- 3.4. Unsustainable exploitation of fisheries and other living resources
- 3.5. Global Changes

- 4. COMMONALITIES AND GAPS
  - 4.1. Commonalities in the causal chain analysis
  - 4.2. Gaps and weaknesses evidenced when conducting the analysis
  - 4.3. Constraints to intervention
- 5. RECOMMENDATIONS
- 6. CONCLUSIONS
- List of Annexes

#### **Slide 5**

INTRODUCTION  
EX. SUMMARY

#### **Slide 6**

(Map)

#### **Slide 7**

Overview

- Ecosystems in sub-Saharan Africa are relatively well preserved
- Natural coastal and marine resources are a major source of community livelihood & economic development
- Degradation of coastal & marine resources evidenced at localized sites

#### **Slide 8**

- Extent and scope of degradation not nationally /regionally significant or insufficiently known (except at spots)
- Explicit link between these resources and development imperatives demonstrated
- Impacts of degradation not sufficiently known
- Cause-effect relationships more difficult to establish at higher levels but converge to similar root causes

#### **Slide 9**

- Danger of further degradation create risk for continued development process
- Wiser and more sustainable use of resources can generate increased inputs and accelerate development process

#### **Slide 10**

Socio-economic characteristics (table)

## **Slide 11**

### Methodology

- Consistent format and approach used
- Considered appropriate and useful
- Focus on coastal and marine
- Distinction HS vs. SA
- Experts from socio/eco and nat. sciences
- Expert adjustment of the scoring
- Limited quantified data, that is consistent
- Reference to specific sites or country as a whole

## **Slide 12**

### SCOPING

## **Slide 13**

Summary table for issues affecting sites (hot-spots, sensitive areas) in the 11 countries

## **Slide 14**

Main issues in the sites (figure)

## **Slide 15**

### Trade

- Trade of goods between neighboring countries
- Migrating' fishermen

### Biodiversity

- Invasive floating plants
- Endangered species (turtles)
- Population of migrant birds / breeding place for marine species

### Water flow

- Exchange of waters and species in marine ecosystems
- International waters and international river catchments

### Pollution

- Transborder pollution

## **Slide 16**

### Commonalties elements

#### Flooding

- Low lying coastal zones

#### Modif of habitat

- Coastal erosion affecting large areas (Bight of Benin)

#### Int. significant bio sites

- WHS (Mz. Is.)
- Ramsar sites

Unsust. Resource use

- Similar practices and effects in countries (eg dynamite fishing)

Global changes

- Similar effects in countries

Pollution

- Similar pollution patterns

### **Slide 17**

Key issues selected in the pilot countries (table)

### **Slide 18**

Selected issues (chart)

### **Slide 19**

Selected issues

- Loss/modification of ecosystem (selected by all countries) / habitat types
- Over-exploitation of resources and destructive fishing practices (selected by 73% of the countries)
- Pollution
- Modification of stream flow (selected by 45% of the countries)

### **Slide 20**

Selected issues from the scoring phase (figure)

### **Slide 21**

ASSESSMENT OF IMPACTS

### **Slide 22**

Analysis of Impacts (chart)

### **Slide 23**

Assessment of Impacts

- Freshwater shortage (or excess)
  - saltwater intrusion / salinisation
  - coastal ecology damages / functioning
  - permanence of inundated areas
  - potential conflict over shared waters
  - reduced fisheries revenues
  - human health affected/threatened

- Pollution
  - nature/extent of the problem
  - env. impacts
  - socio-economic impacts

**Slide 24**

- Loss/modif of ecosystems
  - particular ecosystems: mangrove, coral reefs, shoreline change / coastal erosion, endangered species, introduction of species
  - env. impacts
  - socio-economic impacts
- Unsustainable resource use
  - structure of fisheries
  - destructive fishing practices
  - env. impacts
  - socio-economic impacts
  - transboundary elements
- Global Change effects
- Env. degradation and S. D.

**Slide 25**

CAUSAL CHAIN ANALYSIS

**Slide 26**

(Figure)

**Slide 27**

Causal Chain Analysis

- Changes in freshwater flow
- Pollution (waste and sewage collection and treatment)
- Loss/modification of ecosystems (review of prime causes; review of ecosystems)
- Unsustainable exploitation of fisheries
- Global Changes

**Slide 28**

(Figure)

**Slide 29**

(Figure)

### **Slide 30**

(Figure)

### **Slide 31**

Loss/Modification of ecosystems:  
review of prime causes

- Habitat degradation/replacement as result of land use changes/development
- Reduction in water quality as result of pollution
- Modification of flow and sediments
- Physical damage below water mark
- Unsustainable harvesting/fishing practices
- Loss through coastal erosion
- Partial conversion as result of global change

### **Slide 32**

Global changes as causes to loss/modification of ecosystems or ecotones (table)

### **Slide 33**

GAPS & COMMONALITIES  
RECOMMENDATIONS

### **Slide 34**

Gaps and commonalties

- Commonalties in the causal chain: policies, root causes
- Gaps and weaknesses
- Constraints to intervention:
- limited understanding of ecosystem functioning
  - weakness in policy and legal framework
  - insufficient human capacity
  - institutional weakness (coordination, sharing)

ANNEX V

Guidelines and Reports of Working Groups on Review of Analysis Per Issue

Working Group - session 6 Review of analysis per issue		Global Change
Issue		
Measurable impacts	<p>Environmental:</p> <ul style="list-style-type: none"> <li>Flooding</li> <li>Erosion</li> <li>Extreme events</li> <li>Temperature</li> <li>Biodiversity loss</li> </ul> <p>Immediate cause</p> <ul style="list-style-type: none"> <li>Sea level rise</li> <li>Extreme events</li> <li>Sea temperature</li> </ul>	<p>Socio-economic:</p> <ul style="list-style-type: none"> <li>Damage to tourism amenities</li> <li>Damage to infrastructure</li> <li>Increased cost of mitigation measures</li> </ul> <p>(Inadequate) response</p> <ul style="list-style-type: none"> <li>Root cause</li> <li>Increased emissions of GHG</li> <li>Lack of enforcement of local, nat'l, int'l instruments</li> </ul>
Key causes	<ul style="list-style-type: none"> <li>Energy</li> <li>Transport</li> </ul>	<ul style="list-style-type: none"> <li>Lack of enforcement of local, national, int'l regs/agrs</li> </ul>
Economic sector(s) driving the issue	<ul style="list-style-type: none"> <li>Energy, transportation, industries</li> </ul>	<ul style="list-style-type: none"> <li>Significance of the sector in the national and/or regional economy</li> </ul>
Transboundary elements	Global	Energy and Transport
Stakeholders	Government, private	
National initiatives to alleviate the issue	National and International agreements and protocols	

**Working Group - session 6**  
**Review of analysis per issue**

<b>Coastal Erosion</b>			
Mitra Bhikajee			
<b>Issue:</b>			
Measurable impacts	<p><b>Environmental:</b></p> <p>Destruct. of hab/biota Destruct. of coastal infrastr. Mvmt of estuaries Flooding Lack of siltation (dams)</p> <p><b>Immediate cause</b></p> <p>1. Natural Cyclones</p> <p>2. Man-induced Sand/gravel/clay removal Coastal construction Vegetation removal Reef destruction Dam Construct.</p>	<p><b>Socio-economic:</b></p> <p>(Inadequate) response</p> <p>Inadequate policy/enforce Inadequate awareness Inadequate planning/co-ord</p> <p>Failure of int'l agreements</p>	<p>Loss of livelihood-coastal pop Loss of income</p> <p>Root cause Population pressure Poverty Affluence Global change</p>
key causes	<p>Urbanization Fisheries Tourism</p> <p>Industry Transportation Energy</p>		
Economic sector(s) driving the issue	Urbanization, Fisheries, Tourism, Industry, Transportation, Energy	Significance of the sector in the national and/or regional economy	Transportation (mod to high most countries), urbanization (all countries), tourism (small islands)
Transboundary elements	Damming and transportation		
Stakeholders	Local Communities and Government		
National initiatives to alleviate the issue	Regulations and enforcement, participation in int'l/regional instruments		

**Working Group - session 6  
Review of analysis per issue**

<b>Loss and modification of Coral Reef ecosystems</b>			
<b>Issue:</b>			
Measurable impacts	Environmental: Loss in biodiversity Disturbance of food webs Sectoral pressure	Socio-economic: (Inadequate) response	Increased poverty Loss of income Root cause
Key causes	Immediate cause Destructive fishing Siltation Unsustainable harvest of corals Negligent recreation Coral bleaching Storms/Weather Over fishing	(Inadequate) response Inadequate enforcement legislation/policies Inadequate awareness/education	Poverty Population and economic growth
Economic sector(s) driving the issue	Fisheries Urbanization Agriculture Industry Energy Transport Tourism/Leisure Natural	Significance of the sector in the national and/or regional economy	Very high High High High Low Low High High
Transboundary elements	Market/migration of biota/migrant fishermen/Larval dispersal/poaching		
Stakeholders	Local communities Government	Tourists NGOs Private sector International bodies	Researchers 2.
National initiatives to alleviate the issue	Legislation and enforcement/ Banning export/ Adherence to International conventions/ Marine Parks and Reserves/ ICM programs/ Responsible Eco-tourism/Co-management programmes/EIAs		

**Working Group - session 6  
Review of analysis per issue**

<b>Issue: Loss and modification of Sea grass beds</b>			
<b>Measurable impacts</b>	<b>Environmental:</b> Loss in biodiversity Disturbance of food webs	<b>Socio-economic:</b> Loss of income Root cause	<b>Increased poverty</b>
<b>key causes</b>	<b>Immediate cause</b> Sectoral pressure Increased demand for fisheries resourced Inappropriate gear	<b>(Inadequate) response</b> Inadequate enforcement Inadequate legislation/policies	<b>Poverty</b> <b>Population and economic growth</b>
<b>Economic sector(s) driving the issue</b>	Siltation  Over fishing Negligent recreation Dredging Storms/Weather  Agricultural malpractices Urbanization Market demand  Unmanaged tourism Natural sector	Inadequate awareness/education	Very high  High High High Low Low High High
<b>Transboundary elements</b>	Fisheries  Urbanization Agriculture Industry Energy Transport Tourism/Leisure Natural	Significance of the sector in the national and/or regional economy	
<b>Stakeholders</b>	Market/migration of biota/migrant fishermen/Larval dispersal/poaching/global change Local communities Government	Private sector International bodies	Researchers 2.
<b>National initiatives to alleviate the issue</b>	Legislation and enforcement/ Banning export/ Adherence to International conventions/ Marine Parks and Reserves/ ICM programs/ Responsible Eco-tourism/Co-management programmes/EIAs		

**Working Group - session 6**  
**Review of analysis per issue**

<b>Issue: Lagoon</b>			
Measurable impacts	Environmental:	Socio-economic:	
	Immediate cause	Sectoral pressure	Root cause
key causes	1. Domestic waste 2. Industrial waste	1. Urbanization 2. Industry/agriculture	1. Inadequate enforcement of existing regulation 2.
Economic sector(s) driving the issue	Industry, agriculture, urbanization		Urbanization (60%); industry (30%); agriculture (10%)
Transboundary elements	Sharing coastal lagoon and fish stocks		
Stakeholders	1. General public 2. Industries 3. Local and nat'l authorities 4. NGOs	1. 2.	1. 2.
National initiatives to alleviate the issue	Improvement of sanitation, regulation; enforcement; creation of centres for industrial pollution control; awareness program.		

**Working Group - session 6  
Review of analysis per issue**

Estuaries			
Issue:			
Measurable impacts	Environmental:	Socio-economic:	
	Immediate cause	(Inadequate) response	Root cause
key causes	<ol style="list-style-type: none"> <li>1. Stream flow modification</li> <li>2. Pollution</li> </ol>	<ol style="list-style-type: none"> <li>1. Inadequate resources mgmt</li> <li>2.</li> </ol>	<ol style="list-style-type: none"> <li>1. Population pressure</li> <li>2. Insufficient fresh water</li> </ol>
	<ol style="list-style-type: none"> <li>3. Industries</li> <li>4. Transport</li> </ol>		
Economic sector(s) driving the issue	Significance of the sector in the national and/or regional economy		
Transboundary elements	water supply, agriculture, transport		
Stakeholders	Migratory birds; international harbours; shared water basins.		
	<ol style="list-style-type: none"> <li>1. General public</li> <li>2. Industries</li> </ol>	<ol style="list-style-type: none"> <li>3. Local/Nat'l Authorities</li> <li>4. Community based organizations/NGOs</li> </ol>	<ol style="list-style-type: none"> <li>1.</li> <li>2.</li> </ol>
National initiatives to alleviate the issue	Regulation of water use; regulation of industrial activities; sub-regional mgmt organization.		

## **Slide 1**

Loss/Modification of Ecosystems and Ecotones  
Mangroves

## **Slide 2**

Environmental Impacts

- Reduction in Coverage
- Loss of Biodiversity
- Reduction in recruitment
- Coastal Erosion
- Increase sedimentation
- Reduced nutrient flux

## **Slide 3**

Soci-economic Impacts

- Reduction in income
- Increase in cost of building materials
- Increase in fuel cost
- Reduction in food security
- migration

## **Slide 4**

Immediate Causes

- Land-use changes
  - Agriculture
  - Aquaculture
  - Salt production
  - Settlement
- Oil Pollution
- Oil exploration
- Modification of Stream flow
- Natural causes
  - Storms

## **Slide 5**

Sectoral Pressure

- Energy
  - Lack of affordable source of energy
- Urbanisation

- Lack of affordable sources of building materials
- Limited land/space for expansion
- Inadequate urban planning
- Municipal waste
- Industrial Promotion
  - Waste disposal

### **Slide 6**

#### Inadequate Responses

- Inadequate enforcement of legislation
- Inadequate Policies/ legislation
- Inadequate monitoring and evaluation
- Lack of alternatives

### **Slide 7**

#### Root Causes

- Poverty
- Population pressure
- Low priority given to the mangrove
- Lack of information/data on the ecological value of the resource

### **Slide 8**

#### Economic Sector

- Industry - high
- Agriculture - very high
- Energy - high
- Tourism/Leisure - high
- Fisheries - moderate

### **Slide 9**

#### Transboundary Elements

- Biodiversity loss
- Migration of fishers
- Migratory Birds

### **Slide 10**

#### Stakeholders

- Government
- Community
- Fisherfolk
- NGO
- Private Sector

## **Slide 11**

### Positive Responses

- Institutionalisation of EIA
- Re-afforestation Programmes
- Appropriate Legislation enacted
- MPAs
- Co-management
- Appropriate Technology

Note: There are two issues implicit here. These include both an increase and a decrease (or shortage) of freshwater. Increases are largely caused by natural causes (although there is a link between increasing extreme events and global change), and are exacerbated by poor dam management.

<b>Working Group - session 6</b>			
<b>Review of analysis per issue</b>			
<b>Modification of stream flow</b>			
<b>Issue:</b>			
<b>Measurable impacts</b>	Environmental:	Sectoral pressure	Socio-economic: (Inadequate) response
<b>Key causes</b>	Immediate cause 1. Dams, diversion & abstraction of water 2. Increase in extreme events (can't do much about this)	1. Water for agriculture 2. Increasing demand for drinking water, associated with urbanisation 3. Increased demand for energy, linked to urbanisation	Root cause 1. Development and provision of social amenities 2. Population pressure, including a geographic mismatch of people and water resources
<b>Economic sector(s) driving the issue</b>			
<b>Transboundary elements</b>	Shared rivers, damming alters downstream sediment and nutrient supplies and transports, upstream abstraction leads to less water downstream, etc		
<b>Stakeholders</b>	1. Public sector 2. Private sector	1. Riparian states 2.	1. 2.
<b>National initiatives to alleviate the issue</b>	Integrated water resource management, catchment management, all countries have several initiatives - these should be highlighted in the national reports		

Interventions: these should be long and short-term, and should operate at all levels. They should also be designed for each case.

**Working Group - session 6**  
**Review of analysis per issue**

<b>Overexploitation of Fisheries Resources</b>	
<b>Issue:</b>	<b>Overexploitation of Fisheries Resources</b>
<b>Measurable impacts</b>	<p style="text-align: center;">Environmental:</p> <ol style="list-style-type: none"> <li>1. Changes in community Structure</li> <li>2. Reduction in catch rate</li> <li>3. Loss of biodiversity</li> <li>4. Reduction in recruitment</li> <li>5. Habitat degradation</li> <li>6. Reduction in habitat quality</li> <li>7. Disruption of ecological cycles</li> <li>8. Reduction in stock size</li> </ol> <p style="text-align: center;">Socio-economic:</p> <ol style="list-style-type: none"> <li>1. Loss of income</li> <li>2. Increase in poverty levels</li> <li>3. Migration of people</li> <li>4. Conflict</li> <li>5. Loss of tourism revenue</li> </ol>
<b>key causes</b>	<p style="text-align: center;">Immediate cause</p> <ol style="list-style-type: none"> <li>1. Excessive fishing effort</li> <li>2. Inappropriate fishing gear</li> <li>3. Loss of habitat and nursery grounds</li> </ol> <p style="text-align: center;">Sectoral pressure (Inadequate) response</p> <ol style="list-style-type: none"> <li>1. Increased demand for fisheries resources</li> <li>2. Improvements in harvest efficiency</li> <li>3. Subsidization of fishing</li> <li>4. Overcapitalization</li> <li>5. Cross subsidization</li> <li>6. Lack of capacity to exploit offshore resources</li> <li>7. Inadequate policies or regulations</li> </ol> <p style="text-align: center;">Root cause</p> <ol style="list-style-type: none"> <li>1. Population pressure</li> <li>2. Too few alternatives</li> <li>3. Poverty</li> <li>4. Inadequate awareness</li> </ol>

**Working Group - session 6**  
**Review of analysis per issue**

<b>Overexploitation of Fisheries Resources</b>	
<b>Issue:</b>	<b>Significance of the sector in the national and/or regional economy</b>
<b>Economic sector(s) driving the issue</b> Agriculture Energy Transport Trade Fisheries Urbanization Tourism Industry	Very high Moderate Low Very high Highest High High Moderate
<b>Transboundary elements</b> Shared stocks Migratory stocks Larval dispersal Movement of people Biodiversity Shared rivers Pollution	
<b>Stakeholders</b> Coastal commune Fishing industry Governments NGOs Industry Tourists International markets	International bodies (UN, etc.) Research Institutes
<b>National initiatives to alleviate the issue</b>	National institutional arrangements, monitoring control, education/awareness, alternative income-generating activities, buy back of fishing rights or vessels,  Incentives to reduce pressure, ICM programmes, community participation, artificial reefs, coral transplantation, FADs, MPAs,

## Working group Session 6 – Pollution

Breakdown into issues

### **Issue: Oil Spills**

Impacts:

Environmental: Degradation of water quality (including groundwater)

Accumulation in sediments

Damage to biota

Socio-economic impacts

Clean up costs

### **Socio-economic**

- Reduction in water quality (including potable water quality etc)
- Reduced livelihood of communities (fishing)
- Reduction in amount and value of sea foods
- Reduction recreational use and activities

Costs of clean up.....

### **Causes**

#### **Immediate**

- Accident
- Sabotage
- Technical failure
- Technological failure, including maintenance (fatigue/valve failure)
- Human error
- Inadequate treatment and disposal of wastes and by-products

#### **Sector Pressure**

#### **Energy**

Increased energy demand for transport, energy and industry

#### **Inadequate response**

Inadequate enforcement of existing regulations

Lack of regulations

Use of obsolete equipment and Inadequate measures to replace obsolete equipment

#### **Root cause**

Not given same priority to more renewable resources (lack of alternatives)

Increased pressures to make profits (stakeholders and companies)

Social inequality and poverty, lack of alternative incomes (driving local community to sabotage)

Population pressure.

Economic sector: Energy, Transport and Industry

Significance of sector: 1. Transport (30%), 2. Industry 3. Energy (40%)

Nat initiatives

International conventions

**Sewage**

**Working Group - session 6**  
**Review of analysis per issue**

<b>Oil spills</b>	
<b>Issue:</b>	
Measurable impacts	<p style="text-align: center;">Degradation of water quality (including groundwater), Accumulation in sediments, Damage to biota</p> <p style="text-align: center;">Environmental:</p> <p>Reduction in water quality (including potable water quality etc), Reduced livelihood of communities (fishing), Reduction in amount and value of sea foods. Reduction recreational use and activities, Cost of clean-up of oil spills</p>
Key causes	<p style="text-align: center;">Immediate cause</p> <p>1. Accident</p> <p>2. Sabotage</p> <p>Technical failure</p> <p>Technological failure, including maintenance (fatigue/valve failure)</p> <p>Human error</p> <p>Inadequate treatment and disposal of wastes and by-products</p> <p style="text-align: center;">Sectoral pressure</p> <p>1. Increased energy demand for transport, energy and industry</p> <p>2.</p> <p style="text-align: center;">Socio-economic:</p> <p>(Inadequate) response</p> <p>1. Inadequate enforcement of existing regulations</p> <p>2. Lack of regulations</p> <p style="text-align: center;">Root cause</p> <p>1. Not given same priority to more renewable resources (lack of alternatives)</p> <p>2. Increased pressures to make profits (stakeholders and companies)</p> <p>Social inequality and Poverty, lack of alternative incomes (driving local community to sabotage)</p> <p>Population pressure.</p>
Economic sector(s) driving the issue	<p>Energy, Transport and Industry</p> <p>Significance of the sector in the national and/or regional economy</p> <p>Energy (40%) Transport (30%) Industry (30%)</p>
Transboundary elements	<p>Pollution of international waters, oil tanker roots</p>
Stakeholders	<p>1. Oil companies</p> <p>2. General public</p> <p>1. Government</p> <p>2.</p>
National initiatives to alleviate the issue	<p>Regulations. Enforcement, contingency plans, adherence to international and regional instruments</p>

**Working Group - session 6**  
**Review of analysis per issue**

<b>Issue:</b>				
	Environmental:	Socio-economic:		
Measurable impacts	Immediate cause	Sectoral pressure	(Inadequate) response	Root cause
key causes	1. 2.	1. 2.	1. 2.	1. 2.
Economic sector(s) driving the issue			Significance of the sector in the national and/or regional economy	
Transboundary elements				
Stakeholders	1. 2.	1. 2.	1. 2.	1. 2.
National initiatives to alleviate the issue				

## ANNEX VI

### Regional Overview of National Recommendations

#### Slide 1

GEF MSP Sub-Saharan Africa Project  
"Development and Protection of the Coastal and  
Marine Environment in Sub-Saharan Africa"  
Overview of National Recommendations

#### Slide 2

National recommendations  
The recommendations address areas identified in the Causal Chain analysis

- Immediate causes
- Sectoral causes
- Institutional causes
- Root causes

#### Slide 3

National recommendations

- Côte d'Ivoire
- Ghana
- Kenya
- Mauritius
- Mozambique
- Seychelles
- South Africa
- Tanzania

Not included: Gambia, Nigeria and Senegal

#### Slide 4

Broad categories of common recommendations

- Management of protected areas
- Conservation of biodiversity
- Economic evaluation of environment/habitat
- Small Island Development States (SIDS)
- Sustainable tourism
- Commitment of governments
- Monitoring and assessments (i.e. EIA's)

#### Slide 5

Broad Categories of common recommendations

- Community participation
- Participation of private sector

- Regional/international co-operation
- Strengthening of local administration
- Strengthening of institutional and financial powers
- Public awareness

### **Slide 6**

Recommendations by issue

#### Loss and modification of ecosystems

- Côte d'Ivoire
- Ghana
- Kenya
- Mauritius
- (Nigeria)
- Mozambique
- South Africa
- Tanzania
- (Senegal)
- (Gambia)

### **Slide 7**

Recommendations by issue

#### Loss and modification of ecosystems

- Demographic pressure
- Strengthening of local administration
- Public awareness
- Monitoring and assessments (environmental and socioeconomic)
- Conservation
- Improved infrastructure

### **Slide 8**

Recommendations by issue

#### Loss and modification of ecosystems

- Community participation
- Review of legislation and development of policies
- Education and training
- Management and development of protected areas

### **Slide 9**

Recommendations by issue

#### Over-exploitation of fisheries and other living resources

- Côte d'Ivoire
- Kenya
- Mauritius
- Mozambique

- South Africa
- Tanzania
- (Gambia)

### **Slide 10**

Recommendations by issue  
Over-exploitation of fisheries  
and other living resources

- Review of legislation and development of policies
- Education/training and public awareness
- Monitoring and assessments
- Infrastructure

### **Slide 11**

Recommendations by issue

Pollution

Microbiological pollution

- Côte d'Ivoire
- Ghana

Eutrophication

- Côte d'Ivoire

Chemical pollution

- Côte d'Ivoire
- (Senegal)

Suspended solids

- Kenya

### **Slide 12**

Recommendations by issue

Pollution

- Review of legislation and development of policies
- Education/training and public awareness
- Monitoring and assessments
- Infrastructure

### **Slide 13**

Recommendations by issue

Modification of stream flow

- Ghana
- South Africa
- Mozambique
- (Senegal)

## Slide 14

Recommendations by issue

### Modification of stream flow

- Review of legislation and development of policies
- Education/training and public awareness
- Monitoring and assessments
- Infrastructure

## ANNEX VII

### Guidelines and Reports of Working Groups on Review of Analysis per Sub-Regions

*Objective:* identify and prioritize recommendations, both at the national and regional levels. Recommendations would be at two levels: a) those which would lead to the development and preparation of interventions, i.e. address the technical “bottlenecks”, respond to national priorities and are amenable to intervention (e.g. ‘monitoring of suspended sediment input in the Malindi Bay and its impact on tourism’), and b) those stemming from the identification of gaps and weaknesses in the analysis and/or elements of commonalities (e.g. ‘limited socio-economic data and studies of the impacts of habitat degradation across the sub-region’; ‘inconsistent monitoring of coral reef deterioration in East Africa’).

Upon review of the recommendations of the national reports, it is suggested that the groups first list the main recommendations, clustering them along the proposed headings (adapted from GEF-MSP project document):

- management of fisheries resources;
- control of coastal erosion;
- control of sediment discharge;
- integrated management of river basins and coastal zones, including their living resources;
- pollution control;
- protection and conservation of freshwater resources;
- protection of biological diversity;
- restoration of degraded habitats and resources (please identify the type of habitat and/or resource);
- development of economic, legal and administrative instruments for strengthening environmental protection and sustainable use of resources; and
- adaptation to or mitigation of the impacts associated with climate change related phenomena.

The second step is to prioritize these recommendations. In doing so, it is recommended that the following considerations be discussed and addressed:

- ongoing or planned projects and programmes at the regional and national levels
- national endorsement for the recommendations (i.e. in line with national priorities)
- amenability to intervention and feasibility of the remediation/remedial interventions
- potential for participation of different stakeholders
- sustainability
- conducive institutional context/conditions
- interest of potential financial supporters
- particular political opportunities
- available expertise and technology
- showcase and demonstrative character of the intervention
- public interest, support and participation
- regional strategic importance

The plenary session will then review the prioritized recommendations, highlighting factors of:

- transboundary (in terms of impacts and/or causal relationship, i.e. impacts of an issue extending beyond the borders of the country where the issue is evidenced, or causes of the issue originating beyond the borders of the country where the issue is evidenced)
- representativity - regional dimension
- potential for replicability
- potential for linkages across the recommendations

## **Slide 1**

WG Outline

Theme: UNSUSTAINABLE USE OF LIVING RESOURCES

Scope/subsets:

Relevant existing concepts and recommendations:

national (pilot country)

## **Slide 2**

Relevant existing concepts and recommendations:

sub-regional/regional ( pilot countries)

## **Slide 3**

Additional suggestions (gaps):

sub-regional/regional ( pilot countries)

## **Slide 4**

Linkages:

Other WG:

Linkages:

Other programmes/initiatives:

## **Slide 5**

Tentative partners:

national:

private:

international:

## **Slide 6**

Requirements in terms of expertise, data, support:

## Recommendations - East Africa

### Slide 1

East - Africa - Issues

- Loss + Modification ecosystems + ecot.
- Overexploitation
- Modification of stream flow
- Destructive **fishing** practices
- Pollution (microbiol, suspended sol)

### Slide 2

Loss and Modification of ecosystems + ecotones

- Research into cause/effect
- Alternative income
- MPA's
- Monitoring and evaluation
- Community participation
- Dev of appropriate policies and legislations
- Education /awareness
- Enforcement
- Restoration

### Slide 3

Gaps and recommendation

The group discard due to shortage of time

### Slide 4

Overexploitation

- Research into cause/effect
- Alternative income
- Monitoring and evaluation
- Dev of appropriate policies and legislation
- Enforcement
- MPA's
- Education and awareness
- Community participation

### Slide 5

Modification of stream flow

- Water use efficiency
- Land use planning
- Research and monitoring (inc. met of early warning)

- Enforcement
- Education and awareness
- Dev of appropriate policies and legislation

#### **Slide 6**

Destructive fishing practices

- Alternative livelihood
- Enforcement
- Appropriate gear and vessels
- Community empowerment and participation
- Education and awareness

#### **Slide 7**

Pollution (microbial + suspended solids)

- Land use planning
- Dev of appropriate policies and legislation
- Water quality monitoring
- Community based (and community involvement in waste management)
- Sustainable mangrove harvesting
- EIA

## Environmental Problem Analysis - Mozambique

### Slide 1

The team that carried this assignment:

- Dr Antonio Mubango Hogueane
- Mrs Helena Motta
- Mrs Zelia Menete
- Mr Simeao Lopes

### Slide 2

General Socio-economic conditions of Mozambique:

- $16 \times 10^6$  inh (coastal density =  $40 \text{ inh km}^{-2}$ )
- GDP = USD220
- Main sectors of economy:
  - Fisheries
  - Agriculture and forestry
  - Tourism
  - Transports and communication

### Slide 3

General Environmental conditions of Mozambique:

- Climate - Tropical humid
- 2,700 km of coastline (parabolic dunes, swampy/alluvial and coral/rock cost)
- Various and diverse ecosystems (corals, mangroves, seagrass)
- Relatively preserved habitats
- Abundant natural resources (forestry, wildlife, marine, water)

### Slide 4

Major sites of concern:

- HOT-SPOTS - Are associated with large cities or/and high development activities
  - Maputo Bay (harbour, tourism, industry, fishing)
  - Sofala Bank (harbour, fishing)
  - Nacala and Mozambique Island (harbour, world heritage)

### Slide 5

Major sites of concern:

- SENSITIVE AREAS - Associated with overexploitation, use of inadequate harvesting practices and future development trends (mainly tourism and fishing)
  - Inhaca and Matuituine
  - Bazaruto Arquipelago
  - Marromeu and Zambezi Delta
  - Quirimba Arquipelago

## **Slide 6**

Environmental problem analysis Mozambique

## **Slide 7**

Major environmental issues:

- Overfishing (Overriding)
- Destructive fishing practices (Overriding)
- Loss and modification of ecosystems (Overriding)
- Modification of stream flow

## **Slide 8**

Major environmental impacts:

- Loss of habitats (e.g. erosion, mangroves)
- Reduction in fish stocks
- Deterioration of water quality (e.g. salt intrusion)
- Loss of biodiversity (e.g. endangered species)
- Loss of aesthetic value

## **Slide 9**

Major socio-economy impacts:

- Reduced income
- Loss of employment opportunities
- Reduced options of subsistence of the community
- Conflicts between resource users
- Loss of aesthetic and cultural values

## **Slide 10**

Major Transboundary impacts - Are associated with shared resources and endangered species:

- Conflicts in managing shared rivers
- Conflicts in managing shared fish resources
- Loss of biodiversity (e.g. endangered species, migratory species)
- International prices of fish products affected

## **Slide 11**

Major immediate causes of the environmental problems:

- Increased demand in resources use
- Lack of adequate means of exploitation
- Inadequate management measures
- Lack of knowledge/capacity for developing adequate management strategies
- Natural processes (global climate change)

## **Slide 12**

The proposed projects aim at:

- Building capacity for a better understanding of the ecosystem structure and functioning ( through research/monitoring) as to enable adoption of better management measures
- Maintaining the ecosystems health
- Maintaining the biodiversity

## **Slide 13**

The proposed projects aim at:

- Reducing pressure over the resources and store the fish stocks overexploited
- Diversifying the income generating activities and Increase the income of the local community
- Promoting sustainable development

## **WG: GULF OF GUINEA (WEST AFRICA)**

### **PRIORITISED RECOMMENDATIONS**

#### 1. POLLUTION

- Sewage Management
- Solid waste management
- Port reception facility for waste oil, ballast water etc
- Contingency plan for oil spill

#### 2. COASTAL EROSION

- Monitoring and modelling of oceanographic and coastal dynamics
- Mitigation measures

#### 3. RESORATION OF DEGRADED HABITATS

- Restoration mangrove habitats

#### 4. MANAGEMENT OF FISHERIES RESOURCES

- Promotion of aquaculture
- Strengthening of regulations within the fishery sector

#### 5. STRENGTHENING AND ENFORCEMENT OF REGULATORY MECHANISMS

- Review of existing regulatory and enforcement mechanism
- Human and Institutional capacity building for regulatory and enforcement mechanisms

#### 6. INTEGRATED MANAGEMENT OF RIVER BASINS AND COASTAL ZONES

#### 7. PROTECTION OF BIOLOGICAL DIVERSITY

#### 8. MARINE PROTECTED AREAS.

#### 9. PROTECTION AND CONSERVATION FRESH WATER RESOURCES

#### MANAGERIAL AND POLITICAL CONSIDERATION

These prioritized recommendations and project concepts are likely to receive government support and endorsement because of the high priority in the socio-economic development of countries in the sub region. Because they address actual environment and developmental issues in the sub region, they are likely to receive donor funding. A critical mass of trained scientists and experts exist in the sub region to contribute to implementation and realization of these recommendations and project.

#### TRANSBOUNDARITY

Pollution, coastal erosion, restoration of degraded habitats and management of fisheries resources all have transboundary elements. Implementation of projects under these areas in concert will therefore have a greater impact in addressing the issues sub regionally.

## COMMONALITY:

The causes of the identified problems are similar and cut across International boundaries in the region. The countries in the sub region have similar geographic and institution and legal framework for implementation in each country.

Strengthening and enforcement of regulatory mechanisms is a common need for countries in the sub region.

Public awareness and education is also common need in the sub region.

## **Recommendations - Senegal and Gambia**

### **Slide 1**

#### Identification and Prioritization Recommendations

- Loss and Modification of Ecosystems and Ecotones
  - mangroves
  - coastal erosion
- Over exploitation
  - fisheries

### **Slide 2**

#### Prioritize Recommendations Mangroves

- Research, monitoring and assessment of mangroves
  - lack of knowledge about the ecosystem
  - links with fisheries and other sectors
  - economic value

### **Slide 3**

#### Public awareness

- building materials
- source food
- source fuel wood
- salt extraction

### **Slide 4**

#### Sustainable Management of Mangroves ecosystems

- community participation
- protected area already exist between Gambia and Senegalese
- fisheries
- tourism

### **Slide 5**

#### Restoration program

- coastal protection
- increase demand
- finite area of coverage

### **Slide 6**

#### Over Exploitation

- fisheries Resources

## **Slide 7**

Recommendation Fisheries Resources

## **Slide 8**

Monitoring and control

- poaching
- destructive fishing practices

## **Slide 9**

Research and stock assessment, regional fisheries surveys

- maximum sustainable yield
- prerequisite for policy and legislative development
- there already exist a sub-regional fisheries commission
- due to migratory nature of fish and other aquatic resources

## **Slide 10**

Training and capacity building

- need for the availability of trained personnel to operate and manage monitoring and surveillance equipment
- need for trained personnel to periodically assess stock levels with a view to updating policies and legislation
- need for trained personnel to manage the fisheries resources to ensure sustainable exploitation

## **Slide 11**

Infrastructure

- fishing ports to facilitate better control and assessment of fishing quotas

## Seychelles - Mauritius Working Group

### Slide 1

#### Issues

- Loss and Modification of Ecosystems and Habitats
- Coastal Erosion / Shoreline Change
- Global Change
- Overexploitation

### Slide 2

#### RECOMMENDATION

- All recommendations have been lumped under one heading:
- DEVELOPMENT OF COASTAL AND MARINE MANAGEMENT SYSTEMS

### Slide 3

#### DEVELOPMENT OF COASTAL AND MARINE MANAGEMENT SYSTEM

- Four components:
  - Assessment of ecosystems
  - Assessment of factors impacting on ecosystems (including global change)
  - Determination of man-power needs
  - Development and implementation of management strategies for long-term sustainability

### Slide 4

#### Recommendations to address gaps and weaknesses

- Capacity building
- Research (monitoring of biota, pollution...)
- Legislation (revision, strengthening & implementation of existing laws)
- Sensitisation and promotion of community participation & benefits
- Enforcement
- Infrastructure

### Slide 5

#### MANAGERIAL & POLITICAL CONSIDERATIONS

- The four issues mentioned earlier are the priority ones of the:
- Mauritius Environment Action Plan (NEAP 1998-2007) and the
- Environment Management Plan of Seychelles(EMPS 2001-2010) & Vision 21 Tourism Development in Seychelles 2001-2010

## ANNEX VIII

### List of Participants

#### South Africa

Hon. Ms Rejoice Mabudafhasi MP  
Chairperson of the Preparatory Committee for the  
Partnership Conference  
Deputy Minister of Environmental Affairs and  
Tourism  
Private Bag X447  
Pretoria 0001  
Republic of South Africa  
Tel: +27-12-3219587/21-4621777  
Fax: +27-12-3235181/21-465-2664  
Email: sisjoice@iafrica.com

---

Mr Horst Kleinschmidt  
Deputy Director-General  
Marine and Coastal Management  
Department of Environmental Affairs and Tourism  
Private Bag X2  
Rogge Bay 8012  
Cape Town  
Republic of South Africa  
Tel: +27-21-4023107  
Fax: +27-21-4215151  
Email: hghklein@mcm.wcape.gov.za

---

Mr André Share  
Assistant Director: Coastal Management and  
Coordinator of the African Process  
Marine and Coastal Management  
Department of Environmental Affairs and Tourism  
Private Bag X2  
Rogge Bay 8012  
Cape Town  
Republic of South Africa  
Tel: +27-21-4023035  
Fax: +27-21-4182582  
Email: ashare@mcm.wcape.gov.za  
prepcom@mcm.wcape.gov.za

---

Dr Barry Clark  
Coordinator of the National Team  
Anchor Environmental Consultants  
Zoology Department  
University of Cape Town  
Private Bag  
Rondebosch 7700  
Cape Town  
Republic of South Africa  
Tel/Fax: +27-21-6853400  
Cell: +27-82-3730521  
E-mail: bclark@botzoo.uct.ac.za

Ms Sue Lane  
Expert  
Sue Lane and Associates  
5 Muswell Hill Road  
Mowbray 7700  
Cape Town  
Republic of South Africa  
Tel/Fax: +27-21-6868194  
E-mail: suelane@iafrica.com

---

Mr Mervin Kamoetie  
Director: Office of the Deputy Minister  
Department of Environmental Affairs and Tourism  
Private Bag X447  
Pretoria 0001  
Republic of South Africa  
Tel: +27-12-3219587/21-4621777  
Fax: +27-12-3235181/21-4652664  
Email:

---

Mr Osborne Masilela  
Deputy Director, Office of the Deputy Minister  
Department of Environmental Affairs and Tourism  
Private Bag X447  
Pretoria 0001  
Republic of South Africa  
Tel: +27-12-3219587/21-4621777  
Fax: +27-12-3235181/21-4652664  
Email: omasilela@ozone.pwv.gov.za

---

Ms Janine Hendricks  
Secretariat, African Process  
Marine and Coastal Management  
Department of Environmental Affairs and Tourism  
Private Bag X2  
Rogge Bay 8012  
Cape Town  
Republic of South Africa  
Tel: +27-21-4023545  
Fax: +27-21-4182582  
E-mail: janine@mcm.wcape.gov.za

---

Mr Jackson Penxa  
Secretariat: African Process  
Marine and Coastal Management  
Department of Environmental Affairs and Tourism  
Private Bag X2  
Rogge Bay 8012  
Cape Town  
Republic of South Africa  
Tel: +27-21-4023545  
Fax: +27-21-4182582  
Email: jpenxa@mcm.wcape.gov.za

Ms Eneed Koenane  
Secretary  
Department of Environmental Affairs and Tourism  
Private Bag X447  
Pretoria 0001  
Republic of South Africa  
Tel: +27-12-3193911  
Fax: +27-12-3222682  
Email:

---

#### **Côte d'Ivoire**

Dr Jacques Abe  
Co-ordinator of the National Team  
Head of the Environment Division  
Centre de Recherches Oceanologiques  
29 rue des Pecheurs  
B.P. V 18  
Abidjan  
Côte d'Ivoire  
Tel: +225-21-355014/21-355880/07-085800  
Fax: +225-21-351155/21-246504  
E-mail: abe@cro.ci/jabe1@hotmail.com

---

Mr Aka Marcel Kouassi  
Oceanographer  
Marine Pollution Expert  
Centre de Recherches Oceanologiques  
29 rue des Pecheurs  
B.P. V 18  
Abidjan  
Côte d'Ivoire  
Tel: +225-21-355014/21-355880  
Fax: +225-21-351155/21-246504  
E-mail: kouassi@cro.ci

---

#### **The Gambia**

Mr Saikou B.M. Njai  
Coordinator of the National Team/Expert  
National Environment Agency  
5 Fitzgerald Street  
P.M.B. 48  
Banjul  
The Gambia  
Tel: +224-867178  
Fax: +220-229701  
Email: sbmnjai@excite.com/nea@gamtel.gm  
fantamadi@hotmail.com

---

Mr Alieu Bittaye  
Expert  
National Agricultural Research Institute (NARI)  
P O Box 526  
Serrekunda  
The Gambia  
Tel: +220-483167/484931  
Fax: +220-484921  
Email: bittayea@yahoo.com/nari@qanet.gm

#### **Ghana**

Mr Julius Wellens-Mensah  
Co-ordinator of the National Team  
Chairman of IOCEA  
Hydrological Services Department  
MB 501  
Accra  
Ghana  
Tel: +233-24-321614  
Mobile: +233-21-662989  
Fax: +233-21-677384  
E-mail: hsd@ghana.com  
jwellens\_mensah@hotmail.com

---

Mr Kingsley Tetteh  
Expert  
Deputy Director and Head  
Natural Resources Department  
Environmental Protection Agency  
P O Box M326  
Accra  
Ghana  
Tel: +233-21-664697/662465  
Fax:  
Email: ktetteh56@yahoo.co.uk

---

#### **Kenya**

Dr Johnson M. Kazungu  
Director / Coordinator of the National Team  
Kenya Marine and Fisheries Research Institute  
P O Box 81651  
Mombasa  
Kenya  
Tel: +254-11-475154/2  
Fax: +254-11-475157  
E-mail: jkazungu@recoscix.org

---

Mr Jacob Ochiewo  
Expert  
Kenya Marine and Fisheries Research Institute  
P O Box 81651  
Mombasa  
Kenya  
Tel: +254-11-475154/2  
Fax: +254-11-475157  
E-mail: jochiewo@recoscix.org

---

Mr Ali Mohamed  
Coordinator: Coastal and Marine Programmes  
Ministry of Environmental and Natural Resources  
P O Box 67839  
Nairobi  
Kenya  
Tel: +254-2-248852/243839  
Fax: +254-2-248851  
E-mail: biofish@africaonline.co.ke

## **Mauritius**

Dr Rafic Dulyamamode  
Co-ordinator of the National Team  
Department of Biological Sciences  
Faculty of Science  
University of Mauritius  
Reduit  
Mauritius  
Tel: +230-4541041  
Fax: +230-4656928  
Email: rafic@uom.ac.mu

---

Dr Mitrasen Bhikajee  
Expert  
Department of Biological Science  
Faculty of Science  
University of Mauritius  
Reduit  
Mauritius  
Tel: +230-4541041  
Fax: +230-4656928  
Email: mitra@uom.ac.mu

---

## **Mozambique**

Dr Antonio Mubango Hoguane  
Co-ordinator of the National Team  
Eduardo Mondlane University  
Faculty of Sciences  
Department of Physics  
P O Box 257  
Maputo  
Mozambique  
Tel: +258-1-493377/1-493102  
Fax: +258-1-493377/1-493049  
E-mail: hoguane@hotmail.com  
gtamb@zebra.uem.mz

---

Ms Maria Helena Alves da Motta e Cruz  
Expert  
Environment Working Group (GTA)  
Av. Tomas Nduda, No 1288  
P O Box 2775  
Maputo  
Mozambique  
Tel: +258-1-493102  
Fax: +258-1-493049  
E-mail: gtamb@zebra.uem.mz  
helenamotta@hotmail.com

## **Nigeria**

Dr Lawrence Awosika  
Coordinator of the National Team  
Nigerian Institute for Oceanography and Marine  
Research (NIOMR)  
Wilmot Point Road  
Bar-Beach  
Victoria Island  
P.M.B. 12729  
Lagos  
Nigeria  
Tel/Fax:+234-1-2619517  
E-mail: niomr@linkserve.com.ng  
Larryawosika@yahoo.com

---

Dr Emmanuel Oyewo  
Expert  
Nigerian Institute for Oceanography and  
Marine Research (NIOMR)  
Wilmot Point Road  
Bar Beach  
Victoria Island  
PMB 12729  
Lagos  
Nigeria  
Tel/Fax:+234-1-2619517  
E-mail: niomr@linkserve.com.ng

---

Mr Akin Awobamise  
Zonal Director / Desk Officer  
Marine and Ocean Programme  
National Expert (Institution)  
Federal Ministry of Environment  
Federal Secretariat, 7<sup>th</sup> floor  
Maitama – Abuja  
Nigeria  
Tel: +234-9-5234119/2312994/8108286  
Fax: +234-9-5234931/2-2312994/8108286  
Email: fmenv@hyperia.com

---

Mr Victor Ojogbo  
Aces/GEF Desk Officer  
Federal Ministry of Environment  
Federal Secretariat, 7<sup>th</sup> Floor  
Shehu-Shagari Way  
Abuja - FCT  
Nigeria  
Tel: +234-9-5234931  
Fax: +234-9-5234119  
Email: fepa@hyperia.com

## Senegal

Dr Isabelle Niang-Diop  
Coordinator of the National Team  
Departement de Geologie  
Faculte de Sciences et Techniques  
Universite Cheikh Anta Diop  
Dakar - Fann  
Senegal  
Tel: +221-8250736  
Fax: +221-8246318  
E-mail: isabelle@enda.sn

---

## Seychelles

Mr Terry Jones  
Coordinator of the National Team  
Director-General (International Co-operation)  
Ministry of Foreign Affairs  
P O Box 656  
Victoria  
Mahé  
Seychelles  
Tel: +248-224853/611100  
Fax: +248-224035  
E-mail: terryj@seychelles.net

---

Mr Michel Nalletamby  
Director-General/Expert  
Ministry of Tourism and Civil Aviation  
P O Box 92  
Independence House  
Victoria  
Seychelles  
Tel: +248-611100  
Fax: +248-224035  
E-mail: nalletamby@hotmail.com

---

## United Republic of Tanzania

Dr Julius Francis  
Co-ordinator of the National Team  
Institute of Marine Sciences  
P O Box 668  
Zanzibar  
United Republic of Tanzania  
Tel: +255-24-2233472  
Cell: +255-24-744692970  
Fax: +255-24-2233852  
E-mail: Julius@zims.udsm.ac.tz

---

Dr Gregory Wagner  
Expert  
Department of Zoology and Marine Biology  
University of Dar es Salaam  
P O Box 35064  
Dar es Salaam  
United Republic of Tanzania  
Tel: +255-22-2410193  
Fax: +255-222410038  
E-mail: gwagnertz@yahoo.ca  
gwagner@udsm.ac.tz

---

## United States of America

Ms Elizabeth S. McLanahan  
International Affairs Specialist  
NOAA International Affairs Office  
Department of Commerce  
14<sup>th</sup> & Constitution Avenue NW, Room 6228  
Washington DC 20230  
United States of America  
Tel: +202-4825140  
Fax: +202-4824307  
Email: Elizabeth.McLanahan@noaa.gov

---

## Advisory Committee on Protection of the Sea (ACOPS)

Dr Viktor Sebek  
Executive Director  
ACOPS  
11 Dartmouth Street  
London SW1H 9BN  
United Kingdom  
Tel: +44-207-7993033  
Fax: +44-207-7992933  
E-mail: acopsorg@netcomuk.co.uk

---

Dr Ljubomir Jeftic  
Director of Programmes  
ACOPS  
11 Dartmouth Street  
London SW1H 9BN  
United Kingdom  
Tel: +44-207-7993033  
Fax: +44-207-7992933  
E-mail: jeftic@attglobal.net

---

Ms Paula Caballero  
Assistant Executive Director  
ACOPS  
Cra.12 no 110-57  
Bogota  
Colombia  
Tel: +571-2143631  
Fax: +571-6298232  
Email: agua@cable.net.co

---

Ms Sylvie Goyet  
ACOPS Consultant  
14 Rue Barral de Montferrat  
38100 Grenoble  
France  
Tel: +33-476210941  
Fax: +44-207-7992933 (ACOPS - London)  
Email: sgoyet@aol.com

---

Dr Virginie Hart  
ACOPS Consultant  
45 Oaklands  
Hamilton Rd  
Reading  
United Kingdom  
Tel:  
Fax: +44-207-7992933  
Email: virginiehart@yahoo.com

---

**United Nations Educational, Scientific and Cultural Organisation (UNESCO)**

Mr Julian Barbrière  
Intergovernmental Oceanographic Commission  
(IOC) of UNESCO  
1 Rue Miollis  
75732  
Paris Cedex 15  
France  
Tel: +33-1-45684045  
Fax: +33-1-45685812  
Email: j.barbriere@unesco.org

---

Dr Isabelle Niang-Diop  
IOC Consultant  
Département de Géologie  
Faculté des Sciences et Techniques  
Université Cheikh Anta Diop  
Dakar-Fann  
Senegal  
Tel: +221-8250736  
Fax: +221-8246318  
Email: isabelle@enda.sn

---

**United Nations Environment Programme (UNEP)**

Mr Elik Adler  
Regional Seas Programme Co-ordinator  
Division of Environmental Conventions  
UNEP  
P O Box 30552  
Nairobi  
Kenya  
Tel: +254-2-624033/624544  
Fax: +254-2-624618  
Email: ellik.adler@unep.org

**Global International Waters Assessment (GIWA) / International Ocean Institute (IOI) – South Africa**

Dr Kim Prochazka  
GIWA - South Africa  
International Ocean Institute (IOI)  
Botany Department  
University of the Western Cape  
Private Bag X17  
Bellville 7535  
Republic of South Africa  
Tel: +27-21-9593088  
Cell: +27-8-33028191  
Fax: +27-21-9591213  
E-mail: kprochazka@uwc.ac.za

---

**Non-Governmental Organisations (NGO'S)**

Mr Brett Myrdal  
Manager of the Table Mountain Fund  
WWFSA Marine Coordinator  
Private Bag X2  
Die Boord 7613  
Cape Town  
Republic of South Africa  
Tel: +27-21-7628525  
Fax: +27-21-7621905  
Email: bmyrdal@wwfsa.org.za

## ANNEX IX

### List of Acronyms

ACOPS	Advisory Committee on Protection of the Sea
AMCEN	African Ministerial Conference for the Environment
AVEAMC	Ada/Volta Estuary/Anyanui Mangrove Complex
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
CLC	International Convention on Civil Liability for Oil Pollution Damage
DfID	Department for Industrial Development
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
GEF-LME	Global Environment Facility-Large Marine Ecosystem
GEF-MSP	Global Environment Facility-Medium Size Project
GIWA	Global International Waters Assessment
GOOS	Global Ocean Observing System
IFI	International Financial Institution
IGO	Intergovernmental Organisation
IGR	GPA Intergovernmental Review Meeting
IOC-UNESCO	Intergovernmental Oceanographic Commission of United Nations Environmental, Scientific and Cultural Organisation
IOCEA	IOC Regional Committee for the Central Eastern Atlantic
IOCNCWIO	IOC Regional Committee for the Cooperative Investigation in the North and Central Western Indian Ocean
IPA	Integrated Problem Analysis
IPCC	Intergovernmental Panel on Climate Change
IUCN	World Conservation Union
KMFRI	Kenya Marine Fisheries Research Institute
LOICZ	Land Ocean Interactions in the Coastal Zone
MAP	The Millennium Partnership for the African Recovery Programme
MARPOL	International Convention for the Prevention of Pollution from Ships
NEAP	National Environmental Action Plan
NGO	Nongovernmental Organisation
NOAA	National Oceanic and Atmospheric Administration of USA
OAU	Organisation of African Unity
ODINAFRICA	Ocean Data and Information Network for Africa
PACSICOM	Pan African Conference for the Sustainable Integrated Coastal Management
PAME	Protection of the Arctic Marine Environment
PC	Preparatory Committee for the Partnership Conference
SADC	South African Development Community
SAP	Strategic Action Programme
SEAFO	South East Atlantic Fisheries Organisation
SG	Steering Group of the GEF-MSP sub-Saharan project
SIDS	Small Island Developing States
SSA	Sub-Saharan Africa
UNEP	United Nations Environment Programme
UNEP GOG	UNEP Gulf of Guinea
UNEP GPA	UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
UNEP LME	UNEP Large Marine Ecosystem
UNFCCC	United Nations Framework Convention on Climate Change
WGIPA-III	The Third Meeting of the Working Group on Integrated Problem Analysis
WGPI-I	First Meeting of the Working Group on Programme of Interventions
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature