GEF PROJECT BRIEF

1. Identifiers

Project Number	*Implementing Agency Project Number not yet assigned*
Project Title	Combating living resource depletion and coastal area degradation in the Guinea Current LME through ecosystem-based regional actions
Duration	Five years, beginning June 2004
Implementing Agencies	United Nations Development Programme (UNDP) / United Nations Environment Programme (UNEP)
Executing Agency	United Nations Industrial Development Organization (UNIDO)
Requesting Countries	*Regional:* Angola, Benin, Cameroon, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Gabon, Ghana, Equatorial Guinea, Guinea, Guinea-Bissau, Liberia, Nigeria, Sao Tome and Principe, Sierra Leone and Togo
Eligibility	The countries are eligible under paragraph 9(b) of the GEF Instrument. The Strategic Action Programme is consistent with the relevant provisions of regional and global Conventions relating to International Waters to which the countries are signatories and/or contracting parties.
GEF Focal Areas	International Waters with relevance to Biological Diversity
GEF Programming Framework	OP #9: Integrated Land and Water Component

2. Summary:

This project proposal "Combating Living Resources Depletion and Coastal Area Degradation in the Guinea Current LME through Ecosystem-based Regional Actions" has a primary focus on the priority problems and issues identified by the 16 GCLME countries that have led to unsustainable fisheries and use of other marine resources, as well as the degradation of marine and coastal ecosystems by human activities. The long-term development goals of the project are: 1) recover and sustain depleted fisheries; 2) restore degraded habitats; and 3) reduce land and ship-based pollution by establishing a regional management framework for sustainable use of living and non-living resources in the GCLME. Priority action areas include reversing coastal area degradation and living resources depletion, relying heavily on regional capacity building. The project focuses on nine demonstration projects, designed to be replicable and intended to demonstrate how concrete actions can lead to dramatic improvements. Sustainability will derive from this improved capacity, strengthening of national and regional institutions, improvements in policy/legislative frameworks, and the demonstration of technologies and approaches that will lead to improved ecosystem status. The priority problems of resource depletion, loss of biodiversity (including habitat loss and coastal erosion), and land- and sea-based pollution are all addressed through the interventions proposed here. The project has five main components with associated objectives identified by the root cause analysis carried out during the project preparation process*: i) Finalize SAP and develop sustainable financing mechanism for its implementation; ii) Recovery and sustainability of depleted fisheries and living marine resources including mariculture; iii) Planning for biodiversity conservation, restoration of degraded habitats and developing strategies for reducing coastal erosion; iv) Reduce land and sea-based pollution and improve water quality; and v) Regional coordination and institutional sustainability.* The activities to be undertaken will complement other projects in the region to provide a strong foundation for the long-term sustainable environmental management of the GCLME. A Transboundary Diagnostic Analysis (TDA) and preliminary Strategic Action Programme (SAP) have been prepared, serving as the basis for preparation of this project proposal. The full Global Environment Facility (GEF) project will update the TDA as part of a continuing process, and will endorse a regionally agreed SAP, following clarification of some aspects of the environmental status of the region, and initiate SAP implementation.

3. Costs and Financing (Million US $)

			US$
GEF:	Project:	:	$20.812
	PDF – B	:	$ 0.637
	Subtotal GEF	:	$21.449

Co-Financing:

Governments (cash and in-kind)		$30.356
US NOAA	:	$0.6
UNDP (in cash and kind)	:	$0.1
UNEP (in cash and kind)	:	$0.13
Norway	:	$2.085
*Private Sector	:	$0.6
Subtotal Co-financing	:	$33.871
Total Project Cost		$55.321

4. Associated Financing (Million US $):

Government baseline	:	$799.986
TOTAL	:	**$855.307**

* Discussions still ongoing with Oil Companies in Nigeria and other Private Sector Organizations for co-funding of the Nigeria and Ghana demonstration projects. UNIDO-ICS will inform of its financial contributions.

5. Operational Focal Point Endorsement(s):

Angola: Mrs. Armindo M. Gomes da Silva GEF Focal Point, Ministry of Energy and Water, Luanda	29 September 2003
Benin: Mr. Pascal ZOUNVEOU YAHA, GEF OFP Ministere de l'Environnement, de l'Habitat et de l'Urbanisme, Cotonou	12 August 2003
Cameroon : Ms. Justin NANTCHOU NGOKO Ministry of Environment and Forestry, Yaounde	12 September 2003
Congo: Mr. Joachim OKOURANGOULOU, Directeur Général de l'Environnement, Ministère de l'Economie Forestière et de l'Environnement, Brazzaville	4 August 2003
Congo Dem. Rep.: Mr. Vincent KASULU SEYA MAKONGA Directeur de Developpement Durable, Ministère des Affaires Foncières, Environnement et Tourisme, Kinshasa/Gombe	15 August 2003
Cote d'Ivoire: Mrs. Alimata KONE, Directress Adjoint Caisse Autonome d'Amortissement, Abidjan	10 September 2003
Gabon: Mr. Chris MOMBO NZATSI, Directeur Général de l'Environnement, Ministère de l'Economie forestière, des eaux, de la pêche, chargé de l'environnement et de la protection de la nature, Libreville	8 August 2003
Ghana: Mr. Edward OSEI NSEKYIRE, Chief Director Ministry of Environment, Science and Technology, Accra	31 July 2003
Guinea Bissau: Mme. Matilde da Conceicao Gomes Lopes Directrice Général de l'Environnement, Ministère des Resources Naturelles et de l'Environnement	11 September 2003

Guinea:	Mme. Kadiatou N'DIAYE, GEF Focal Point Manager, National Environment Directorate, Conakry	6 August 2003
Guinea Equatorial:	HE Don Fortunato OFA MBA Ministro, Ministro de Pesca y Medio Ambiente, Malabo	09 April 2003
Liberia:	Mr. Fodee KROMAH, Executive Director GEF Focal Point, National Environmental Commission of Liberia, Monrovia	30 July 2003
Nigeria:	Mr. Ayodele Adekunle OLOJEDE, GEF Focal Point Federal Ministry of Environment, Abuja	8 August 2003
Sao Tome & Principe:	Mr. Lourenco MONTEIRO DE JESUS GEF Focal Point, INDES, Sao Tome	13 August 2003
Sierra Leone:	Mr. Stephen Syril James JUSU, Director GEF Focal Point, Environment Protection Department Ministry of Lands, Country Planning and the Environment, Freetown	12 August 2003
Togo:	Mr. Yao Djiwomu FOLLY, Ing. Des Travaux des Eaux et Forets, Directeur de la Protection et du Controle de l'Exploitation de la Flore, Ministère de l'Environnement et des Ressources, Lome	7 August 2003

6. IA Contact:

(a) Mr. Frank Pinto, Executive Coordinator UNDP/GEF

(b) Mr. Ahmed Djoghlaf, Director & Assistant Executive Director, UNEP/GEF Co-ordination Office, UNEP, Nairobi, Tel: 254-20-624166; Fax: 254-20-624041; Email: Ahmed.Djoghlaf@unep.org

ACRONYMS

ACOPS	Advisory Committee for the Protection of the Seas
AfDB	African Development Bank
APR	Annual Programme/Project Report
BCLME	Benguela Current Large Marine Ecosystem
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CCLME	Canary Current Large Marine Ecosystem
CECAF	Fishery Committee for the Eastern Central Atlantic
CEDA	Centre for Environment and Development in Africa
COMARAF	Training and Research for the Integrated Development of African Coastal Systems
CPUE	Catch per Unit Effort
CTA	Chief Technical Advisor
DIM	Data and Information Management
EIA	Environmental Impact Assessment
EQO	Environmental Quality Objective
ESI	Environmental Status Indicator
FAO	Food and Agriculture Organization of the United Nations
FEDEN	Foundation for Environmental Development and Education in Nigeria
GCC	Guinea Current Commission
GCLME	Guinea Current Large Marine Ecosystem
GEF	Global Environment Facility
GIS	Geographic Information System
GIWA	Global International Waters Assessment
GOG-LME	Gulf of Guinea Large Marine Ecosystem
HAB	Harmful Algal Bloom
IA	Implementing Agency
ICAM	Integrated Coastal Areas Management
ICARM	Integrated Coastal Area and River Basin Management
ICS-UNIDO	International Centre for Science and High Technology - UNIDO
ICZM	Integrated Coastal Zone Management
IGCC	Interim Guinea Current Commission
IMC	Inter-Ministerial Committee
IMO	International Maritime Organization
IOC-UNESCO	Intergovernmental Oceanographic Commission of UNESCO
IUCN	The World Conservation Union
IW:LEARN	International Waters (IW) Learning, Exchange and Resource Network Program
LBA	Land-Based Activities
LME	Large Marine Ecosystem
LOICZ	Land-Oceans Interactions in the Coastal Zone
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
MPPI	Major Perceived Problems and Issues
NAP	National Action Plan
NEAP	National Environmental Action Plan
NEPAD	The New Partnership for Africa's Development
NFP	National Focal Point
NGO	Non-governmental Organization
NPA/LBA	National Programme of Action/Land-Based Activities
NOAA	National Oceanic and Atmospheric Administration

OP	Operational Program
PCU	Project Coordination Unit
PDF	Project Development Facility
PI	Process Indicator
PIR	Project Implementation Review
PPER	Project Performance and Evaluation Review
PSC	Project Steering Committee
RCU	Regional Coordination Unit
RPA/LBA	Regional Programme of Action/Land-Based Activities
SAP	Strategic Action Programme
TDA	Transboundary Diagnostic Analysis
UNDESA	United Nations Department of Economic and Social Affairs
TPR	Tri-Partite Review
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WACAF	West and Central African Action Plan
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

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BACKGROUND AND CONTEXT – BASELINE COURSE OF ACTION

INTRODUCTION

1. The shared transboundary waters off the coast of western Africa are defined by the Guinea Current Large Marine Ecosystem (GCLME) that extends from Bissagos Island (Guinea Bissau) in the north to Cape Lopez (Gabon) in the south. The oceanography of the waters of the Democratic Republic of Congo, Republic of Congo and Angola is influenced to a considerable extent by the Guinea Current thus giving ample justification for including the three countries in the Guinea Current Large Marine Ecosystem (GCLME). Figure 1 shows the area of the Project, along with the major oceanographic features. The south equatorial current (SEC) forms a logical boundary between the Benguela Current LME to the South and the GCLME to the north. A similar diagram based on averaged satellite-derived ocean productivity estimates similarly demonstrates the SEC as the logical boundary between the two LMEs.

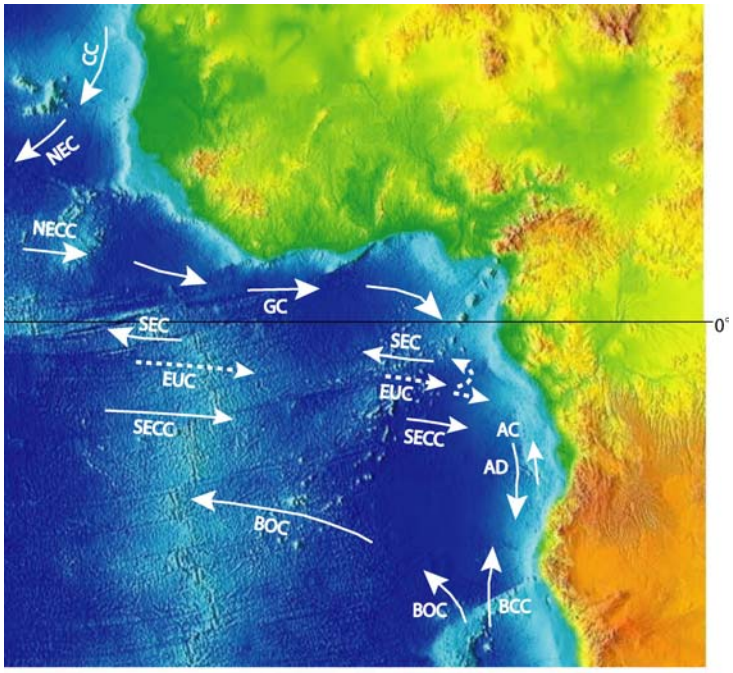

Figure 1 : Location map for the GCLME, indicating major currents

2. Therefore, the GCLME stretches from the coast of Guinea Bissau to Angola, covering sixteen countries (Angola, Benin, Cameroon, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Gabon, Ghana, Equatorial Guinea, Guinea, Guinea-Bissau, Liberia, Nigeria, Sao Tome and Principe, Sierra Leone and Togo: see Figure 3). It embodies some of the major coastal upwelling sub-ecosystems of the world and is an important center of marine biodiversity and marine food production. Characterized by distinctive bathymetry, hydrography, chemistry, and trophodynamics, the Guinea Current System represents a Large Marine Ecosystem (LME) ranked among the most productive coastal and offshore waters in the world with rich fishery resources, oil and gas reserves, precious minerals, a high potential for tourism and serves as an important reservoir of marine biological diversity of global significance. The Guinea Current therefore represents a distinct economic and food fish security source with the continuum of coastal and offshore waters together with the associated near shore watersheds. Over-exploitation of fisheries, pollution from domestic and industry sources, and poorly planned and managed coastal developments and near-shore activities are, however, resulting in a rapid degradation of vulnerable

coastal and offshore habitats and shared living marine resources of the GCLME putting the economies and health of the populace at risk (see Transboundary Diagnostic Analysis, Annex E).

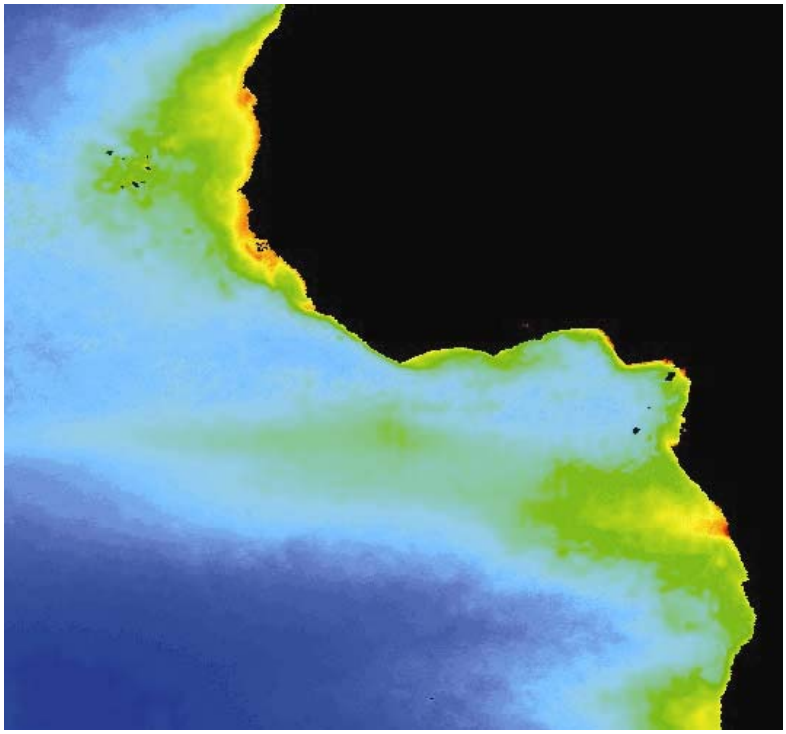

Figure 2 : Satellite productivity map of GCLME/ Benguela LME region

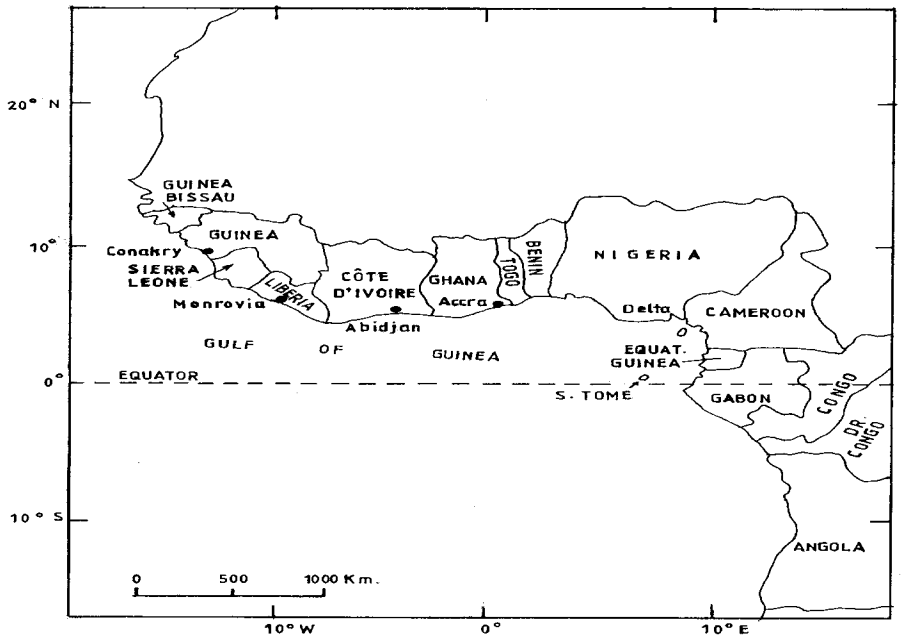

Figure 3 : Location map for the GCLME

3. The GCLME is rich in biodiversity. The fisheries resources of the ecosystem includes a diverse assemblage of fishes including small pelagics, (sardinellas shad), large pelagics (tuna and billfish), crustaceans and molluscs (shrimp, lobster, cuttlefish, and demersal species (sparids and croakers). The presence of invertebrates such as intertidal molluscs *(Anadara sp. Crassostrea* g.,etc.), reptiles (turtles, crocodiles), marine mammals such as the West African manatee *(Trichechus senegalensi*s), and some shark species demonstrate the variety of the species in the GCLME (World Bank Report, 1994). The remarkable collection of migratory birds, millions of which seasonally visit the West African coast and mainland regions, illustrates the importance of preserving and maintaining the existing wetlands in this part of Africa (UNEP Regional Seas Reports and Studies No. 171). Large concentrations of seabirds are found seasonally in and around Guinea Bissau: these include *Larus genei, Geochelidon nilotica, Sterna maxima lbididorsalis, et*c. The Gulf of Guinea islands, near Principe and Sao Tome also have sizeable sites with colonies of terns, noddies and boobies. It is because of this species diversity and fauna richness that conservation and preservation policy has been or is being undertaken by some GCLME countries through the creation and implementation of marine and coastal protected areas

4. The coastal area also includes important terrestrial flora. Mangroves, typically *Rhizophora sp, Conocarpus sp, Avicennia sp, Mitragyna inermis, Laguncularia sp*, occur almost everywhere along the coasts in the GCLME and are dominant in certain places, such as the Niger Delta of Nigeria which has Africa's largest and the world's third largest mangrove forests (Figure 4). Mangrove forests provide the nutritional inputs to adjacent shallow channel and bay systems that constitute the primary habitat of a large number of aquatic species of commercial importance. The importance of mangrove areas as spawning and breeding grounds for many transboundary fish species and shrimps is well known. Presently the mangrove forests are under pressure from over-cutting (for fuel wood and construction timber) and from other anthropogenic impacts (e.g. pollution), thereby jeopardising their roles in the regeneration of living resources and as reservoirs of biological diversity (see TDA).

MAP OF NIGER DELTA SHOWING THE MANGROVE REGION

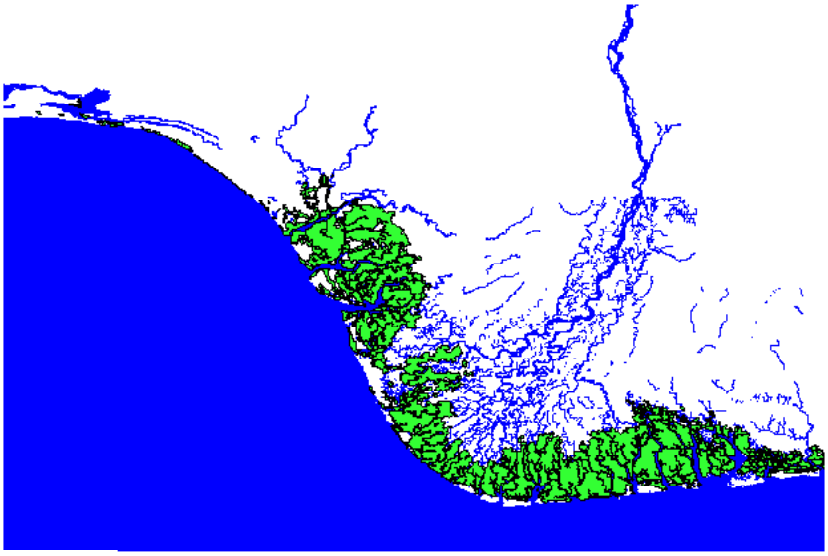

Figure 4: Map of distribution of mangroves in the Niger Delta

5. The densely populated coastal region is heavily dependent upon the biological resources of the GCLME. Approximately 40% of the region's 300 million people (more than 1/2 of the population of the African continent) live in the coastal areas of the GCLME, many of whom are dependent on the lagoons,

estuaries, creeks and inshore waters surrounding them for their food security and well being. Rivers, lagoons, and inshore and offshore waters of the GCLME serve as important sources of animal protein in the form of fish and shellfish, as well as provide significant income through the coastal fisheries. The Food and Agriculture Organization of the United Nations (FAO) estimates the total potential fisheries yield of the entire region to be in the neighborhood of 7.8 million tons per year. The rich fishery resources are of both local and transboundary importance with stocks supporting artisanal fisheries and offshore industrial fisheries from many nations. Most of these straddling and migratory stocks have attracted large commercial fishing fleets from around the world, especially from the former Soviet Union, European Union, Eastern Europe, Republic of Korea, and Japan. This wealth of estuaries, deltas, coastal lagoons and the nutrient-rich upwelling cold waters make a major contribution to the diversity of fish life in the GCLME region with an estimated 239 fish species, including *Sardinella aurita and maderensis*, *Thunnus albacares*, etc. as pelagic species; *Arius sp*., *Pseudotolothus typus and senegalensis, Dentex sp., Octopus vulgaris, Cynoglossus sp.,* and others as demersal species. Pelagic tuna fishing also constitutes an important industry in the GCLME region.

6. These marine and coastal areas, including their upstream freshwater regions, are at present affected by a number of anthropogenic activities: over-exploitation of fishery resources, impacts from the land-based settlements and activities from industrial, agricultural, urban and domestic sewage run-off and other mining activities such as oil and gas (in particular, off the coasts of Angola, Cameroon, Gabon and Nigeria). The depletion of living resources, uncertainty in ecosystem status (including climate change effects), deterioration of water quality, and loss of habitats (including coastal erosion) have been identified as significant transboundary environmental problems in the GCLME region (see section on major perceived problems and issues).

7. The region's fish stocks are under threat from overfishing. Since the 1960s, the offshore commercial fishing efforts have exerted extreme pressures on the resources, placing the fisheries at risk of collapse. This is exacerbated by the presence of local industrial fleets, predominantly nationally-owned or part of joint ventures operating in each other's waters under bilateral agreements, as well as the existence of a large artisanal sector with strong traditional roots and powerful social and political impacts. Pelagic and demersal fisheries within the region are fully exploited with evidence showing that the landings of many species are currently declining. The decline in fish availability in the subsistence sector has led to the adoption of destructive fishing practices such as use of undersize meshes and blast fishing. Based on present consumption patterns and population growth rates, most of the countries, especially the large coastal cities of Lagos, Abidjan, Accra and Douala, will need significantly more fish by 2010 just to meet domestic demand. Despite nutritional requirements and current population growth rates, the industrial (commercial) fisheries sector in the countries surrounding the GCLME generally exports the trawl fisheries products to generate foreign exchange, exacerbating the food security situation in the region. Pressure on the coastal resources is therefore likely to increase significantly in the immediate future, but Catch per Unit Effort (CPUE) is already exceeding sustainable yields in some countries (Ajayi, 1994, The Status of Marine Fishery Resources of the Gulf of Guinea: In : Proc. 10th Session FAO, CECAF, Accra, Ghana, 10-13 October 1994) while species diversity and average body total lengths of the most important fish assemblages have declined. The GCLME project support from the GEF and other partners will assist the region to meet the WSSD target for maintaining and restoring fish stocks to levels that can "on an urgent basis and, where possible, no later than 2015" produce maximum sustained yields.

8. Uncertainty in ecosystem status makes it impossible to manage the natural resources effectively. Lack of national budget, inadequate regional capacity, and the general low socio-economic conditions in much of the region are responsible for this uncertainty in ecosystem status. Ecosystem knowledge is not a high priority in many of these countries; even if it were, capacity and institutions are lacking. The possible effects of climate change are also unknown; lacking knowledge of climate change impacts, effective management and establishment of sustainable development goals are clearly impossible.

9 Oil and other industrial activities have been identified as threats to the sensitive GCLME environment. Some of the countries in the region are oil producers and a few (e.g., Angola, Cameroon, Gabon and Nigeria) are net exporters. The increasing number of offshore platforms, pipelines, and various export/import oil terminals means an inevitable exposure to oil pollution. According to the World Bank (1995), oil producing companies in Nigeria Leone discharge an estimated 710 tons of oil yearly into the coastal and marine environment. An additional 2100 tons originate annually from oil spills, on average. The patterns of onshore-offshore winds and ocean currents mean that oil introduced from any of the offshore or shore-based petroleum activities translates easily into a regional problem. Most of the countries also have important refineries on the coast, only a few of which have proper effluent treatment plants, thereby adding to the threat of pollution from oil. Pipelines are at risk, given the unsettled coastal populations in some of the countries, where frequent pipeline breaches have occurred.

10. In addition to oil pollution, water quality in the coastal and marine areas is being degraded, largely as a result of land-based activities such as agriculture. Agriculture is an important activity in all the countries of the region. The use of chemical fertilisers and pesticides has markedly increased with the development of commercial agriculture and the advent of large plantations and the need to improve food production and protect human health against insect-borne diseases. Although organochlorine-based pesticides are still used, awareness of their danger has spread so the majority of pesticides are now organo-phosphorous and carbamate based. Run-off of these chemicals may reach surface or groundwater, where they may persist for long periods. Inorganic, especially nitrate and phosphate-based, fertilisers are being used on an increasing scale. Substantial quantities of nutrients originating from domestic and agricultural effluents, which are used in primary production, are carried to the sea through river outflows. It has been estimated that approximately 30% of fertilizers applied are actually utilised by the plants while the remainder finds its way into the atmosphere or into surface waters. These nutrients, when coupled with sewage pollution, are a serious threat increasing levels of eutrophication in near coastal waters and especially to lagoons and causing harmful algal blooms. The lagoons, as sensitive and significant habitats supporting biodiversity and inshore fisheries, are therefore being threatened by agricultural pollution. These excess nutrients, other pollution and sediments are transported to the GCLME via the rivers in the region, including the ten major rivers: Congo (Congo), Niger (Nigeria), Volta (Ghana), Wouri (Cameroon), Comoe, and Bandama (Côte d'Ivoire).

11. The physical destruction of coastal habitats, including critical wetlands, causes the loss of spawning and breeding grounds for most living resources in coastal waters and the loss of the rich and varied fauna and flora of the region including some rare and endangered species. Much of the destruction is related to often-haphazard physical development, which exerts phenomenal pollution pressures on this international body of water (WACAF Intersecretariat Co-ordination Meeting, Rome, 1993). Nearly all major cities, agricultural plantations, harbours, airports, industries as well as other aspects of the socio-economic infrastructure in the region are located at or near the coast. Results obtained during the Pilot Phase GOG-LME Project showed that in Ghana, 55 percent of the mangroves and significant wetlands around the greater Accra area have been decimated through pollution and overcutting. In Benin, the figure is 45 percent in the Lake Nokoué area, in Nigeria, 33 percent in the Niger Delta, in Cameroon, 28 percent in the Wouri Estuary, and in Côte d'Ivoire, about 60 percent in the Bay of Cocody. Urbanization and industrialization place increasing pressure on coastal habitats, both through direct physical pressure, and indirectly through pollution and declining water quality.

12. Alterations to river flow regimes from dam construction (for irrigation and power generation) together with high wave action have led to severe coastal erosion problems, issues of which are expected to be addressed in part in parallel GEF projects in the Volta and Niger River basins. These factors are combining to cause displacements of structures, people and economies of coastal communities and urban centres. Harbour construction activities have altered longshore current transport of sediments and in

many cases have led to major erosion and siltation problems. Erosion rates caused by port structures in Liberia, Togo, Benin and Nigeria sometimes reach a staggering 15-25 m per year and threaten infrastructure and services (Ibe and Quelennec, 1989). Actions to control erosion around these ports are critically important to maintaining their vitality as sites for growing tourist, recreational, commercial, and defence needs.

13. Many of the water-related environmental threats identified in the region are transboundary in nature. The GCLME Transboundary Diagnostic Analysis (Annex E), formulated by the countries, fully lists the various transboundary environmental issues/problems, major root causes, transboundary impacts and consequences and possible measures to contain the threats. Some of these threats are already cause for concern. A few are already being addressed jointly between nations. Others are likely to grow in importance with human population growth and increased urbanisation and industrialisation in the stakeholder countries. These transboundary threats to ecosystem health are caused by human activities and natural variations which are part of the ecosystems, and some threats could be mitigated through efficient early warning systems.

14. Many transboundary threats (e.g., untreated waste) are also of local (national) importance. Actions in response to local pressures to reduce local impact will often serve also to reduce transboundary impact. Other actions at national levels, if not integrated with actions of neighboring countries, may merely displace the problem and even increase the overall transboundary impact. Other transboundary threats are more widely distributed and may be of a cumulative nature.

15. The sustainable use and management of the commonly shared resources of the GCLME poses a great challenge to the bordering countries. Concerted actions by the sixteen participating nations are absolutely essential to change present unsustainable use of these resources by introducing an ecosystem-based assessment and management system for sustainable use and management of resources at risk. One source of stress on the marine environment which is of growing international concern is the impact from capture fisheries, hence the need to develop, promote, and implement ecologically sound assessment and management practices in the marine fisheries sector so as to prevent loss of biodiversity and reduce habitat degradation. Available data suggest that, in addition to the obvious catches of fish for human needs, by –catches have a significant ecological impact and cause mortality amongst fin-fish (particularly the juveniles of commercial fish species), as well as amongst benthic invertebrates, marine mammals, turtles and birds. These by-catches need to be controlled. Mariculture offers the possibility of providing a food source that releases fishing pressure in the capture fisheries and provides livelihoods for rural coastal areas when fishing effort is reduced. However ecologically unsound mariculture practices can negatively impact wild resources. Development must proceed in a sound ecological manner to have fishery and food security benefits.

16. Recognizing the continuous negative changes in the health and productivity of the GCLME shared waterbody resulting from human impact and appreciating that living marine resources and pollutants in coastal and marine environments respect no political boundaries and few geographical ones, the countries resolved to work together to address their common concerns through suitable management options. Through various assessments carried out, the countries realized that the traditional sectoral approach to management had failed in bringing about the needed changes in environmental and living resource uses and resolved to adopt a holistic and multisectoral approach embodied in the large marine ecosystem concept. In so doing, the countries, through the Committee of Ministers of the six-country pilot phase Gulf of Guinea LME project with subsequent endorsement by the 10 new project countries, sought the assistance of UNIDO, UNDP, UNEP and GEF in implementing an LME project to cover the natural limits of the Guinea Current. The GEF made available two project preparation and development facility grants (PDF-B) to enable countries to prepare the necessary analyses and reviews. In accordance with the GEF Operational Strategy a Transboundary Diagnostic Analysis (TDA) and preliminary

Strategic Action Programme (SAP) were prepared through national and regional stakeholder consultations.

17. More specifically, the PDF project was responsible for:

- identifying overexploited fish stocks, biodiversity issues, degraded and threatened habitats, and point and non-point pollution sources;
- undertaking a comprehensive review, synthesis, and analysis of existing data and information concerning the sources and fate of transboundary pollution as a building block on which to design appropriate actions;
- reviewing existing national and regional fisheries and environmental legislation relating to the GCLME and its surrounding environment; and
- providing a framework to support an ecosystem-based approach for the assessment and management of the GCLME fisheries and coastal zone based on scientific, institutional, legal, and regulatory structure needed to achieve and sustain the marine resources of the GCLME.

GEF PROGRAMMING CONTEXT

18. The programming context of this project is the GEF Operational Programme No. 9 "Integrated Land and Water Multiple Focal Area". This OP lists as an expected outcome *"the reduction of stress to the international waters environment in selected parts of all five development regions across the globe through participating countries making changes in their sectoral policies, making critical investments, developing necessary programs and collaborating jointly in implementing ... water resources protection measures* (para 9.10)." The OP also states that *"the goal is to help groups of countries utilise the full range of technical, economic, financial, regulatory, and institutional measures needed to operationalize the sustainable development strategies for international waters* (para 9.2)."

19. This project is thus in conformity with the GEF Operational Strategy and Operational Programmes, in particular with the above-mentioned OP #9 - International Waters: Integrated Land and Water Multiple Focal Area, where there is a focus on an integrated management approach to the sustainable use of [land and] water resources on an area-wide basis. It will also have relevance to OP #2 - Biodiversity in coastal and marine ecosystems, and specifically to aspects of eco-system management including elements of: targeted research, information-sharing, training, institutional-strengthening, demonstrations, and outreach (or 'extension').

20. The GEF International Waters Operational Programme referred to above emphasizes the need to introduce and practice ecosystem-based assessment and management action while supporting "institutional building ... and specific capacity-strengthening measures so that policy, legal and institutional changes can be enacted in sectors contributing to transboundary environmental degradation." This project supports institutional capacity building for long-term regional cooperation as well as helping to strengthen regional capacities in environmental management, monitoring of priority pollutants, public awareness, and preservation of transboundary living resources.

21. Under OP 9 several outputs from IW projects are envisaged. These include:

a. a comprehensive transboundary environmental analysis identifying top priority multi-country ecosystem-based resource and environmental concerns (already in hand);

b. a strategic action programme consisting of expected baseline and additional actions needed to implement an integrated approach to land and water resources assessment and management (a draft is available; the SAP will be updated during the full project);

c. documentation of stakeholder participation to determine expected baseline and additional actions to be implemented as well as community involvement in the project; and

d. implementation of measures related to integrated management of land and water resources that have incremental costs and that can generate global environmental benefits in several focal areas.

22 The project preparation process has addressed several of these issues (as indicated above). The proposed project will satisfy all of the above points. Ministries of environment, ministries with control of land and water resources, as well as new institutions created by the project will play a key role in the implementation of project activities, thus enhancing capacity within the institutions as well as complementing and strengthening existing national efforts to address environmental issues. Implementation of the final SAP will assist in the systematic assessment and conservation of natural resources and assist the countries in complying with their national and regional obligations under various international conventions. At a global level, the project and its SAP will have molded disparate regional and national activities into a coherent ecosystem-based assessment and management program for the globally important resources of the GCLME.

23. The present project also is consistent with the recent Draft GEF International Waters Focal Area-Strategic Priorities in Support of WSSD Outcomes for FY 2003-2006. The document lists various priorities, including:

Priority A. Catalyze financial resource mobilization for implementation of reforms and stress reduction measures agreed through TDA-SAP or equivalent processes for particular transboundary systems

Priority B. Expand global coverage of foundational capacity building addressing the two key program gaps and support for targeted learning.

Priority C. Undertake innovative demonstrations for reducing contaminants and addressing water scarcity issues.

24. The present project contributes significantly to the WSSD targets for 1) introducing ecosystem-based assessment and management practices by 2010, and 2) recovering depleted fish stocks to maximum sustainable yield levels by 2015. It will directly assist in addressing key International Waters gaps, with a focus on ecosystem-based approaches to management of Large Marine Ecosystems (LMEs) that include fisheries resources and habitat. The project will also assist in achieving the targets for these priorities for addressing African Transboundary waters.

25. This project also is consistent with the "Action plan to respond to the recommendations of the Second GEF Assembly, the policy recommendations of the Third Replenishment, the Second Overall Performance Study of the GEF and the World Summit on Sustainable Development" as discussed and agreed at the May 2003 GEF Council Meeting. It is also consistent with the document "Strategic Business Planning: Direction and Targets," also discussed and agreed at the May 2003 GEF Council Meeting. The following internal specific targets are consistent with the GCLME project:

Under Strategic Priority IW-1:

(b) By 2006, GEF will have catalyzed a Strategic Partnership among African coastal nations, implementing agencies, and global development partners aimed at reversing the depletion of fisheries resources in the Large Marine Ecosystems (LMEs) of Sub-Saharan Africa as a contribution to WSSD POI sustainable fisheries target.

Under Strategic Priority IW-2:

(a) By 2006, GEF will have increased by at least one-third the global coverage of representative water bodies (an additional 9-10) with country-driven, science based joint management programs with GEF assistance.

(c) By 2006, almost one-half of the 27 Large Marine Ecosystems (LMEs) located near developing countries will have country-driven, ecosystem-based management programs developed with GEF assistance that contribute to the WSSD POI "sustainable fisheries" target with a view to those programs being under implementation by 2010.

26. The GCLME project will both benefit and benefit from other GEF projects being undertaken in the region and on the global level. Table 1 shows the ongoing GEF regional activities related in some manner to the GCLME LME. Efforts will be made to ensure synergies among the projects and minimize duplication of work, by setting aside funds in this project to achieve project integration for these GEF activities. Examples of these projects include: A global GEF project on "reduction of environmental impact from tropical shrimp trawling through the introduction of by-catch reduction technologies and change of management" executed by FAO and implemented by UNEP is already assisting two countries (Cameroon and Nigeria) in the GCLME region in minimizing the impacts on fisheries of use of wrong mesh-sizes. The GCLME project would establish linkages with this GEF project in order that some of the best practices and innovative techniques learned could be replicated in the other GCLME countries. For coastal erosion, living resource management, conservation of biodiversity in coastal ecosystems and community management close linkages and coordination with the Volta River GEF project as well as the World Bank/GEF Coastal Biodiversity Management programme in Guinea Bissau and the World Bank/GEF Coastal Zone Integrated Management Programme in Benin Republic will help assure consistency in approaches, cohesiveness of GEF support and optimal use of GEF resources and avoid duplication efforts in these countries. Strong linkages and coordination will also be achieved with other upcoming GEF projects, through constant dialogue and communication, notably the World Bank/GEF Strategic Partnership to promote the sustainable governance of fisheries in African countries and the World Bank Guinea Coastal Zone Management programme. Under the World Bank "Strategic Partnership" regional project, country-level investments in sustainable fisheries will be implemented in concert with the GEF LME projects in Sub-Saharan countries. The initiative will work with the LME projects (the GCLME for part of the West and Central Africa region) to support the coastal countries in meeting the targets for sustainable fisheries set by the WSSD, including country-level monitoring, surveillance and enforcement of national laws and regulations with regard to fisheries and other marine and coastal resources. In essence, the "Strategic Partnership" would coordinate with and build upon the GCLME project to facilitate collaboration between national players for country-level fisheries investments and existing/planned sub-regional fisheries management bodies supported by GCLME project.

Table 1: Ongoing or planned GEF IW, BD, POPs & MFA projects related to the GCLME

Project	GEF Focal Area	GEF IA(s)	Countries	Est'd. GEF Financing	Est'd. Co-financing	Total Financing	Status
Addressing Transboundary Concerns in the Volta River Basin and its Downstream Coastal Area	IW	UNEP	Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo	$5.7 m.	$10.4 m.	$16.1 m.	Approved
Reduction of Environmental Impact from Tropical Shrimp	IW	UNEP	Cameroon, NIgeria (part of global)	$4.8 m.	$4.4 m.	$9.2 m.	Approved

Trawling through Introduction of By-catch Technologies and Change of Management							
Reducing Reliance on Agricultural Pesticide Use and Establishing a Community Based Pollution Prevention System in the Senegal and Niger River Basins	IW	UNEP	Benin, Guinea et al.	$3.4 m.	$4 m.	$7.4 m.	Pdf-b
Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa	IW	UNEP	Cote d'Ivoire, Ghana, Nigeria et al.	$0.75 m.	$0.97 m.	$1.72 m.	Approved
Reversing Land and Water Degradation Trends in the Niger River Basin	IW	UNDP/ WB	Benin, Cameroon, Cote d'Ivoire, Guinea, Nigeria et al.	$13 m.	$16.7 m.	$29.7 m.	Approved
Reduction of Environmental Impact from Coastal Tourism through Introduction of Policy changes and strengthening public-private partnerships	IW	UNEP	Cote d'Ivoire, Ghana, Nigeria	$6 m.	$7.5 m.	$13.5 m.	Pipeline
Review of the Existing Agreements on River Basins in West Africa and development of a regional water protocol	IW	UNEP	Guinea, Nigeria, Benin, Cameroon, Cote d'Ivoire	TBD	TBD	TBD	Pdf-a
Benin ICARM Coastal Area Management	BD	WB	Benin	$5 m.	$25 m	$30 m.	Pdf-b
Control of Exotic Aquatic Weeds in Rivers and Coastal Lagoons to Enhance and Restore Biodiversity	BD	UNDP	Cote d'Ivoire	$3 m.	$1.9 m.	$4.9 m.	Approved
Coastal Wetlands Management	BD	WB	Ghana	$7.2 m.	$1.1 m.	$8.3 m.	Approved
Guinean Coastal Zone Integrated Management and Preservation of Biodiversity	BD	WB	Guinea	$5 m.	$25 m.	$30 m.	Pdf-b
Coastal and Biodiversity Management Program	BD	WB	Guinea-Bissau	$5.1 m.	$4.4 m.	$9.5 m.	Pdf-b
Conservation of Marine Turtles and their Habitat in the	BD	UNEP	GCLME countries	$0.75 m.	$0.75 m.	$1.5 m.	Pipeline

Atlantic Coast of Africa							
POPs Enabling Activity – Preparation of National Implementation Plan	POPs	UNEP	Benin, Cameroon, Cote d'Ivoire, Guinea	$2 m.	----	$2 m.	Approved
POPs Enabling Activity – Preparation of National Implementation Plan	POPs	UNIDO	Gabon, Ghana, Guinea-Bissau, Liberia, Nigeria, Togo, Sao Tome & Principe	$3.5 m.	----	$3.5 m.	Approved
Enhancement and Conservation of Ecosystem Functions for River Basins and Associated Coastal Areas in Central Africa	MFA	UNEP	Cameroon, Benin, Ghana	TBD	TBD	TBD	Pdf-a
Strategic Partnership for Sustainable Fisheries Management in the LMEs of SSA	IW	WB	Countries of Sub-Saharan Africa	TBD	TBD	TBD	PDF-b
GRAND TOTALS	----	----	----	**$57.2 m.**	**$94.1 m.**	**$151.3 m.**	----

REGIONAL PROGRAMMING CONTEXT

27. The outstanding accomplishments of the Pilot-Phase GEF Gulf of Guinea Large Marine Ecosystem (GOG LME) Project (1995 - 1999), as verified in Tri-Partite Review Reports and the Final In-Depth Evaluation, are ample proof of the catalytic and defining roles that GEF incremental funding can play. Some of the results achieved are included here. Annex K provides a more in-depth review of the pilot phase.

- adoption of Ministerial level ACCRA DECLARATION(1998) aimed at institutionalising a new ecosystem-wide paradigm consistent with GEF operational guidelines for joint actions in environmental and living resources assessment and management in the Gulf of Guinea and beyond;
- substantial progress in building regional and national water quality, productivity and fisheries assessment and management capabilities based on standardised methodologies;
- planning and implementation of two co-operative surveys(first in the western gulf in July/ August, 1996 and second in the entire Gulf, in Feb/March, 1999) of demersal fish populations conducted by the six countries . The data, albeit limited, have served already as the basis for certain common national regulatory actions for the co-ordinated management of the fish stocks of the Gulf;
- definition of regional effluent standards based on a detailed survey of industries and recommendations made for the control and significant reduction of industrial pollution;
- deriving from the detailed industrial survey, a successful campaign for reduction, recovery, recycling and re-use of industrial wastes based on the concept of the <<waste stock exchange management system >> was launched in Ghana as a cost-effective waste management tool and will be extended to other project countries;

- initiation of co-operative monitoring of the productivity of the LME using ships of opportunity. The results give indications of the carrying capacity of the ecosystem which enables projections on food security and by extension, social stability in the sub- region;
- preparation of coastal profiles for the six project countries, followed by the development of national Guidelines for Integrated Coastal Areas Management (ICAM) and the preparation of draft national ICAM plans which were in different stages of adoption by the end of the Pilot Phase Project;
- establishment of cross-sectoral LME committees in the participating countries consistent with the cross sectoral approach implied in integrated management;
- accelerating the creation of national and regional data-bases, using harmonised architecture, as decision making support tools;
- facilitating the establishment of a functional non-governmental organisation (NGO) regional network;
- promoting active grassroots and gender participation in discussion, decision-making and interventions in environmental and resources management;
- active collaboration arrangements with other projects and organisations in the region;
- initiation of community-based mangrove restoration activities in all six project countries;
- successful completion of 41 training workshops with 842 participants ,416 in regional workshops and 426 in National ICAM workshops resulting in the setting up of a regional network of over 500 contactable specialists linked by electronic mail; and
- development of a preliminary Transboundary Diagnostic Analysis (TDA) for the Gulf of Guinea.

28. The Pilot Phase project, although limited to six countries, initiated the work of mitigating pollution pressures on International Waters of the Gulf of Guinea and stemming the loss of biological diversity and fisheries overexploitation by fostering regional co-operation predicated policies and strategies as well as joint institutional mechanisms. An Executive Summary of the Final In-Depth Evaluation is attached as Annex K.

29 Eager to preserve the gains of the pilot phase, the Ministers adopted "The Accra Declaration" (see Annex L) which aimed at institutionalising a new ecosystem-wide paradigm consistent with the GEF Operational Guideline for joint actions in the environmental and natural resources assessment and management in the Gulf of Guinea. The Ministers called for initiation of a second phase of an expanded project to include 10 additional countries to coincide with the natural limits of the Guinea Current Large Marine Ecosystem. The Ministers also addressed a letter to the UNDP Administrator requesting him to intervene with the GEF Secretariat for a substantial grant of US$ 20 million for an expanded Second Phase Project (Annex M).

30. The environmental goals of the project are consistent with of the Abidjan Convention for Co-operation in the Protection, Management and Development of the Marine and Coastal Environment of the West and Central African Region adopted in March 1981. The Abidjan Convention and its Protocol on Cooperation in Combating Pollution in Cases of Emergency constitute the legal components of the West and Central African (WACAF) Action Plan. The Convention expresses the decision of the WACAF Region (from Mauritania to Angola at the time of adoption) to deal individually and jointly with common marine and coastal environmental problems. The Convention also provides an important framework through which national policy makers and resource managers can implement national control measures in the protection and development of the marine and coastal environment of the WACAF Region. The Emergency Protocol was designed with an orientation towards combating and operationally responding to massive pollution in case of marine accidental oil and chemical spills.

31. At its first meeting (Abidjan, 20-22 July, 1981), the newly constituted Steering Committee of the Convention defined the following priorities:

- Development of oil spill contingency plans
- Combating coastal erosion
- Prevention, monitoring and control of marine pollution
- Rational development of coastal zones
- Capacity building particularly in the areas of documentation and legislation on coastal and marine management.

32. Since its entry into force in August 1984, Parties to the Abidjan Convention have, with UNEP's assistance, undertaken a number of activities including:

- development of programmes for marine pollution prevention, monitoring and control in cooperation with IMO, FAO, UNIDO, IOC-UNESCO, WHO, IAEA, etc.
- development of programmes for monitoring, controlling and combating coastal erosion dominantly with UNESCO and UNDESA.
- development of national environmental impact assessment programmes for particular coastal sites
- development of national environmental legislation in cooperation with FAO and IMO.

33. As originally envisaged in the provisions of the Convention, the WACAF Regional Coordination Unit, was to co-ordinate the implementation of the West and Central African Action Plan and was to ensure the most efficient use of the regional sea through concerted actions by Member States and the optimal utilisation of their shared living resources. It was to co-ordinate regional (as opposed to national) development of the coastal and marine environment and to assist in the prevention and resolution of disputes that might arise between and among the Parties to the Convention. However, lack of resources for the Regional Coordination Unit (RCU) has adversely affected the implementation of the above-mentioned projects.

34. These weaknesses in the Abidjan Convention and its RCU are being addressed in a companion project, "Implementation of the NEPAD Partnership Programme as it relates to land-based pollution in the West and Central African -Regions as a contribution to the Abidjan Convention." This project, submitted for funding to the Government of Norway by the Coordination Office of the Global Program of Action for the Protection of the Marine Environment from Land-based Activities, will go hand-in-hand with the present project to develop increased capacity in the region. This project has five major components:

- **COMPONENT 1: STRENGTHENED WEST & CENTRAL AFRICAN REGIONS (WACAF/RCU)**
- **COMPONENT 2: NATIONAL PROGRAMMES OF ACTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT FROM LAND-BASED ACTIVITIES (NPA)**
- **COMPONENT 3: INTEGRATED COASTAL AREA &-RIVER BASIN MANAGEMENT (ICARM)**
- **COMPONENT 4: PHYSICAL ALTERATIONS AND DESTRUCTION OF HABITATS (PADH)**
- **COMPONENT 5: COORDINATION AND SUPPORT**

With a total budget of U.S. $2.075 million, this project complements the proposed GEF project by addressing specific areas of the GEF project (IIg, IIIC, IVb, IVc, and Va).

35. There is an encouraging history of co-operation between the countries bordering the GCLME even if the results, outputs and impacts have been variable. Examples of collaborative activities under the Abidjan Convention include "Control of Coastal Erosion in West and Central Africa (WACAF/3)", "Manual on Methodologies for Monitoring Coastal Erosion in West and Central Africa (WACAF/6)", "Assessment and Control of Pollution in the Coastal and Marine Environment of West and Central Africa (WACAF/2 phases I and II)", and WACAF/11 on " Integrated Watersheds and Coastal Area Management

Planning and Development in West and Central African Region". The countries in the GCLME sub-region also participated in the continent wide UNDP/UNESCO Regional Project (RAF/87/038) on Training and Research for the Integrated Development of African Coastal Systems (COMARAF) and have experience of joint programming in the context of the Fishery Committee for the Eastern Central Atlantic (CECAF) under the aegis of FAO which has been trying to promote joint actions on living resource evaluation and fishery statistics.

36. Such activities have created a new awareness of mostly domestic issues and engendered a certain sense of urgency on environmental matters. However, their overall impact has been impaired by a lack of success in focusing on transboundary ecosystem-wide International Waters problems and the need to strengthen environmental and resource stewardship at both national and regional levels. This lack of focus has been exacerbated by the absence of a mechanism for funding incremental costs in the existing Regional Seas Programmes, and a lack of resources for an effective co-ordination Secretariat. A proposed strategy for revitalising both the Abidjan and Nairobi Conventions exists and was embodied in the GEF funded Medium Sized Project implemented by Advisory Committee for the Protection of the Seas (ACOPS) and which ended with a "Partnership Conference" in September 2002 on the sidelines of the World Summit on Sustainable Development (Rio + 10 Conference) in South Africa. There is little direct evidence that the strategy was successful.

37. Most of the new projects in the region under GEF funding including those of its co-operating Agencies (UNDP, World Bank and UNEP), such as the Canary and Benguela Currents LME Projects, the Niger, Senegal and Volta River Basins Projects, the Congo Basin Data and Information Management Project, the Control of Aquatic Weeds Project in Cote d'Ivoire, etc., have sought to draw attention to current inadequacies of national and regional institutions and programmes to address the large scale and complex transboundary problems that characterise International Waters. These institutions are consequently helping, through Incremental funding, the countries involved in these projects to resolve such problems by augmenting their capabilities and promoting collaboration to achieve regional institutionalisation of joint mechanisms for comprehensive and durable ecosystem wide management.

NATIONAL PROGRAMMING CONTEXT

38. The participating countries are at various stages of industrialization and various levels of socio-economic development. The rapid economic development that has occurred in this region over the last decade has taken place largely at the expense of the living marine resources and the environment. A significant barrier to planning for more ecosystem-based and-sustainable modes of development has been the absence of adequate ecological and economic evaluation of habitats and the goods and services they provide, resulting in development decisions being made on the basis of short-term economic gains. Numerous actions are taking place at the national and regional levels to address the environmental problems that have resulted from the rapid pace of development and industrialization, which have occurred over the last decade. Nigeria, for example, has a national mangrove reforestation programme, and all countries have activities and programmes related to the conservation of significant biological diversity including wetlands. Many of the actions at a national level are undertaken outside the framework of integrated or coordinated joint programmes of action for the GCLME transboundary issues resulting in either significant duplication and overlap, or no action at all.

39. The lack of a regionally coordinated approach to preventive and remedial actions significantly reduces their effectiveness, and recognizing this the countries bordering the GCLME have initiated a number of joint programmes involving two or more countries within the region in the past including joint programming in the context of the Fishery Committee for the Eastern Central Atlantic (CECAF) under the aegis of FAO which has been trying to promote joint actions on living resource evaluation and fishery

statistics. The pilot phase Gulf of Guinea LME project further facilitated the strengthening of regional collaboration among some of the countries. There is an encouraging history of co-operation between the countries bordering the GCLME even if the results, outputs and impacts have been variable. Examples of collaborative activities under the Abidjan Convention 1981 include "Control of Coastal Erosion in West and Central Africa (WACAF/3)", "Manual on Methodologies for Monitoring Coastal Erosion in West and Central Africa (WACAF/6)", "Assessment and Control of Pollution in the Coastal and Marine Environment of West and Central Africa (WACAF/2 phases I and II)", and WACAF/11 on " Integrated Watersheds and Coastal Area Management Planning and Development in West and Central African Region".

40. In the absence of a GEF intervention, it is probable that the present types of sectoral-based interventions which have been demonstrated during the past twenty years as being ineffective in halting the pace of environmental degradation will continue. Without a concerted ecosystem-based regional approach to environmental management it is unlikely that the present rates of habitat degradation and living marine resources depletion will be slowed. The likely consequence of such a scenario is the loss of globally significant biological diversity during the next century, combined with collapse of fish stocks and food security in the region.

41. Unresolved territorial disputes are a source of sensitivity in the region. During the last several years the countries have demonstrated a willingness to co-operate in matters relating to environmental management, and there is an increasing recognition that the benefits resulting from co-operative environmental management actions are not dependent on the resolution of such sensitive issues. Recognizing the sensitivities of the area, however, it has been agreed that no activities shall be undertaken under this project in disputed areas of the GCLME, nor shall issues of sovereignty be addressed directly or indirectly through project activities.

SYSTEM BOUNDARIES

42. The Guinea Current is the dominant feature of the shallow ocean off the coast of countries in western Africa stretching from Guinea Bissau in the north to Angola in the south. The distinctive bathymetry, hydrography, productivity and trophodynamics of this shallow ocean qualify it as a Large Marine Ecosystem (LME) and is indeed recognised as one of the sixty-four LMEs delineated globally.

43. The boundaries of the Guinea Current area can be defined geographically and oceanographically. Geographically, the GCLME extends from approximately 12 degrees N latitude south to about 16 degrees S latitude, and variously from 20 degrees west to about 12 degrees East longitude. From an oceanographic sense, the GCLME extends in a north-south direction from the intense upwelling area of the Guinea Current south to the northern seasonal limit of the Benguela Oceanographic Current (Figure 1). In an east-west sense, the GCLME includes the drainage basins of the major rivers seaward to the GC front delimiting the GC from open ocean waters (a time- and space-variable boundary).

MAJOR PERCEIVED PROBLEMS AND ISSUES

44. The process of developing the sixteen-country Transboundary Diagnostic Analysis and preliminary Strategic Action Programme (TDA/SAP) included the formation of National committees in each participating country to prepare comprehensive, country-based analyses of water-related environmental problems and concerns. The assessments conducted included analyses of ecosystem-wide issues of environmental and resource sustainability from the perspective of system: 1) productivity, 2)

fish and fisheries, 3) pollution and ecosystem health, 4) socio-economics, and 5) governance in an effort to identify the most important transboundary natural resource management problems.

45. The first drafts of the national reports were submitted and evaluated at the Stocktaking workshop in May 2001, which prepared a comparative weighting of all identified major issues. On the basis of the national reports, a Transboundary Diagnostic Analysis (TDA) was prepared, reviewed and updated by country and regional experts in two subsequent meetings in April and June 2003. The results of the TDA provide the scientific, technical and socio-economic bases for the choice of priority actions proposed in this project and which served as the basis for development of a preliminary Strategic Action Programme (SAP) that would provide greater long-term, system wide, environmental and socio-economic benefits to the countries. Governments, NGO'S, economic sector operatives, the public and all other affected stakeholders participated in TDA formulation thus fostering broad based involvement and support for the project.

46. The TDA identifies the regional priorities among water-related problems and concerns, their socio-economic and sectoral root causes, and the extent to which the problems are transboundary in either origin or effect. The four major transboundary environmental problems/issues (MPPI) identified in the TDA are:

1. Decline in GCLME fish stocks and unsustainable harvesting of living resources;
2. Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including effects of global climate change;
3. Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms;
4. Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion.

47. Table 2 outlines the major transboundary elements of the four major perceived problems identified in the GCLME, as well as their environmental and socio-economic impacts.

Table 2. MPPIs and Their Impacts in the GCLME

MPPI	Transboundary Elements	Environmental Impacts	Socio-economic Impacts
I. Decline in GCLME fish stocks and unsustainable harvesting of living resources	• Loss of income from regional and global trade of marine products • Region-wide decrease in biodiversity of the marine living resources including the disappearance of high-quality critical natural resources • Region-wide destructive fishing techniques degrading mangrove habitats • Increasing catch effort on pelagic species such as tuna, sardinella • Non-compliance with the FAO Fisheries Code of Conduct • Region-wide pollution	• Loss of biodiversity • Changes in food web • Changes in community structure due to over-exploitation of one or more key species • Increased vulnerability of commercially-important species • Long-term changes in genetic diversity • Stock reduction • Loss of predators • Habitat degradation due to destructive fishing technique	• Reduced income • Loss of employment • Population migration • Conflicts between user groups • Loss of recreational opportunities • Decline in protein • Loss of income from regional and global trade in coastal products
II. Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including the effects of climate change	• The major causes of climate change are global • Harvested fish species are shared between countries • Exotic species have been introduced into the GCLME from other regions	• Major change in ecosystem production • Changed ocean currents • Changed ocean temperature structure • Diminished role of ocean as co_2 sink • Increased natural hazards • Increased droughts • Changes in upwelling frequency, location and intensity	• Lost earnings • Disruption of way of life • Destruction of property and lives • Reduced crop yields • Loss of tourism
III. Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms	• Many of the rivers flowing into the GCLME are transboundary • Sea-based pollution can be transported across borders • Loss of regional tourism revenue	• Reduced productivity • Much altered biodiversity • Red tides and algal blooms • Invasion of water weeds • Permanently changed LME • Introduction of exotic species. • Eutrophication • Bioaccumulation of toxics • Increased turbidity	• Economic loss • Disruption of communities • Increased sickness and death • Aesthetic loss and lower quality of life • Biodiversity loss • Reduced fishery yields • Loss of recreational value • Population migration

IV. Habitat destruction and alteration including inter-alia modification of seabed and coastal zone, degradation of coastscapes and coastal erosion	• Marine living resources are often migratory • Coastal zone habitats are the backbone for the productivity of marine and coastal habitats • The coastal habitats provide feeding and nursery grounds to migratory species • The coastal habitats are accumulating transboundary pollution • Degradation of coastal habitats contribute to the overall decline of regional and global biodiversity • Impact to migratory species and their habitats	• Loss of spawning breeding grounds • Loss of rich and varied fauna and flora including endangered species • Loss of CO_2 sequestration • Loss of pollution buffer • Loss of flood and storm surge protection • Depletion of mangroves • Loss of natural productivity	• Loss of global heritage • Decimation of life support systems • Forestry loss • Economic and aesthetic loss • Increased pollution • Increased flood and erosion risk • Loss of agricultural lands • Loss of cultural heritage • Reduction in income from fisheries • Loss of recreational areas

48. The identified Root Causes of the four transboundary environmental problems include:

- Complexity of ecosystem and high degree of variability (resources and environment),
- Lack of an ecosystem-wide funded and coordinated assessment and management system for the productivity of coastal and marine living resources of critical importance to the nations bordering the GCLME,
- Inadequate capacity development (human and infrastructure) and training,
- Poor or ineffective legal framework at the regional and national levels; inadequate implementation of national regulatory instruments; lack of regional harmonization of regulations,
- Inadequate implementation of available regulatory instruments,
- Inadequate planning at all levels,
- Lack of regional agreements;
- Insufficient or inappropriate institutional structures;
- Insufficient public/stakeholder involvement,
- Inadequate financial mechanisms and support,
- Poverty,
- Insufficient financing mechanisms and support,
- Lack of political will;
- Inadequate monitoring, control, and surveillance; and
- Absence of economic instruments for sustainability of environmental interventions.

49. The Transboundary Diagnostic Analysis provides more comprehensive information on the root causes and sources of the problems identified above. This document gives an initial iteration of the various actions and interventions to be taken under the headings of three overarching Ecosystem Quality Objectives supported by concrete targets, which are given below, to address the major perceived problems and issues through mitigation and/or elimination of the root causes.

RATIONALE AND OBJECTIVES (ALTERNATIVE COURSE OF ACTION)

50. The overall development goals of this project are to 1) recover depleted fish stocks, 2) restore degraded habitat, and 3) reduce land and ship-based pollution and 4) create an ecosystem-wide assessment and management framework for sustainable use of living and non-living resources in the GCLME. Priority action areas rely heavily on regional capacity building. Sustainability will derive from this improved capacity, strengthening of national and regional institutions and improvements in policy/legislative frameworks.

51. The TDA identified the major perceived problems and issues (MPPI) in the region and then analyzed the root causes based on this analysis. The preliminary SAP lists three overarching Ecosystem Quality Objectives as a possible basis for long-term action to improve the GCLME environment. The following EQOs with their associated targets serve as the priority areas of intervention in the GCLME project:

1) Sustainable Fisheries

Preliminary Targets

- Populations of threatened species stabilized and/or recovering by 2010
- Fish populations restored to levels of mid-1970s by 2015 (based on the quality of available data)
- All commercially important fish species being fished sustainably with minimum by-catch and habitat impacts by 2015.

2) High Quality Water to Sustain Balanced Ecosystem

Preliminary Targets

- Reduce annual inputs of all priority land and sea-based pollutants to the marine environment by at least 10% by 2015
- Measurably improve water quality in two priority coastal hotspots in each country by 2010

3) Balanced Habitats for Sustainable Ecology and Environment

Preliminary Targets

- Zero net loss of mangroves by 2015
- Reduced areal coverage of eutrophied lagoons by 50% by 2015
- Measurably reduced coastal erosion at five sites by 2010

52. Each of the three over-arching EQOs addresses more than one of the MPPIs identified in the TDA. As such, implementing actions to achieve these EQOs will address the GCLME's MPPIs.

1) Achieve Sustainable Fisheries

Addresses the following MPPIs:

- Decline in GCLME fish stocks and non-optimal harvesting of living resources;
- Uncertainty regarding ecosystem status and yields in a highly variable environment including the effects of global climate change;
- Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc.).

2) High Quality Water to Sustain Balanced Ecosystem

Addresses the following MPPIs:

- Decline in GCLME fish stocks and non-optimal harvesting of living resources;
- Deterioration in water quality (chronic and catastrophic) due to pollution from land and sea-based activities, eutrophication and harmful algal blooms;
- Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes and coastline erosion;
- Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc.).

3) Balanced Habitats for Sustainable Ecology and Environment

Addresses the following MPPIs:

- Decline in GCLME fish stocks and non-optional harvesting of living resources;
- Deterioration in water quality (chronic and catastrophic) due to pollution from land and sea-based activities, eutrophication and harmful algal blooms;
- Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes and coastline erosion;
- Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc.).
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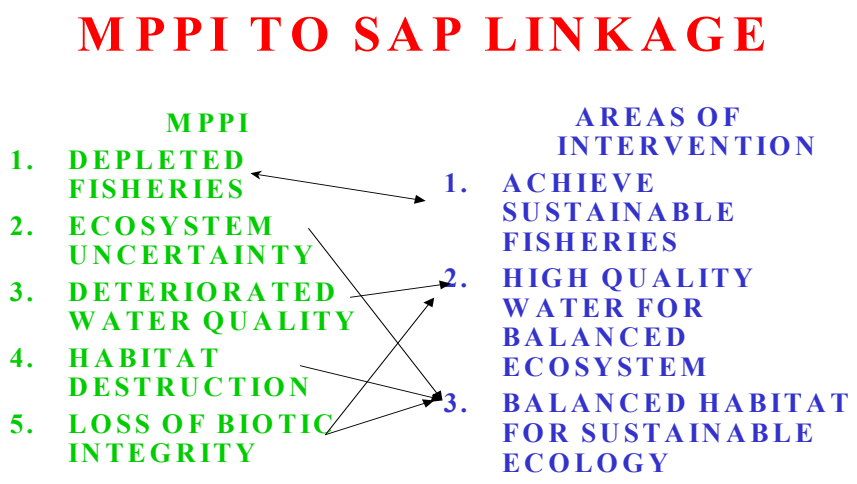
Figure 5. Map of linkages between Major Perceived Problems and Issues with the Areas of Intervention (EQOs) identified in the SAP.



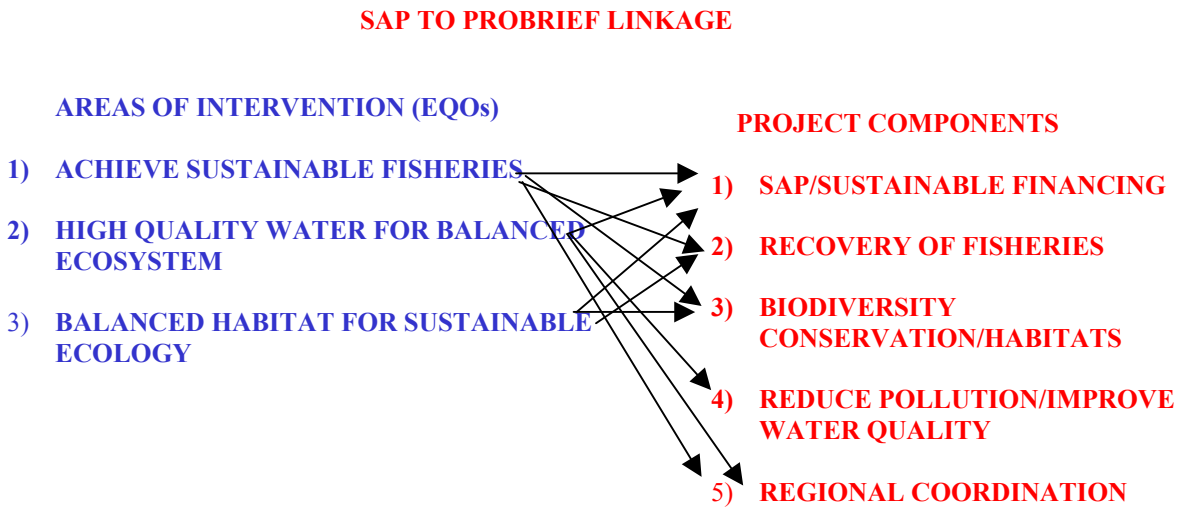
53. To satisfy the broad development goal and begin to achieve the identified EQOs with their targets, the project has five major components:

1) Finalize SAP and develop sustainable financing mechanism for its implementation
2) Recovery and sustainability of depleted fisheries and living marine resources including mariculture

3) Planning for biodiversity conservation, restoration of degraded habitats and developing strategies for reducing coastal erosion
4) Reduce land and sea-based pollution and improve water quality
5) Regional Coordination and Institutional Sustainability

54. Each of the above components includes activities that will lead to the achievement of at least one of the EQOs identified in the TDA and SAP, as follows:

Figure 6. Graphic linkages between the Areas of Intervention of the SAP (EQOs) and the Full Project Components.



PROJECT OUTCOMES/COMPONENTS

55. The project is divided into five major components reflecting the priority ranking determined at the regional level by the Regional Scientific and Task Team. These five principal components offer the greatest potential project benefits in terms of environmental protection from both national and transboundary perspectives over the project's lifespan. The five principal components and their associated objectives were developed for the project based on the areas of threats identified by the TDA, and areas of intervention identified in the SAP. These major components have associated objectives, activities and results, which are listed below in summary form.

56. As a follow-on to the Pilot Phase GGLME project, this project is in the phase of early SAP implementation. Clearly identified in the process leading to this phase has been the need for regional and national demonstration projects to advance SAP implementation. A list of priority demonstration projects was developed, and then the demonstrations were assigned either to a single country, or for regional execution. The demonstration projects identified by this process are nine in number:

1. Fisheries: introduction and maintenance of an assessment and management system to achieve and support the long-term sustainability of the Fish and Fisheries of this ecosystem: regional execution
2. Environmental Information Management: regional execution
3. Marine productivity assessment: regional execution
4. Nypa Palm Clearance and Mangrove restoration: Nigeria
5. Waste Stock exchange management system: Ghana
6. Reduction of nutrient discharges: Togo
7. ICAM for Kribe-Limbe Lagoon: Cameroon
8. Low-cost protection from coastal erosion: Cote d'Ivoire
9. Protected area management: Benin

57. These nine demonstration projects all address key issues identified during the Pilot Phase and Preparatory Phase of the GCLME project. These demonstration projects are nested within the major areas of intervention as described below. Each demonstration project has an associated budget, regional or national management mechanism, and incremental cost analysis. Each demonstration project has significant co-financing from various sources, including the private sector.

Demonstration Project	MPPI Addressed	EQO Addressed	Components
Fisheries: introduction and maintenance of an assessment and management system to achieve and support the long-term sustainability of the Fish and Fisheries of this ecosystem management	• Decline in GCLME fish stocks • Uncertainty regarding ecosystem status	1) Sustainable Fisheries	COMP. I: Finalize TDA, SAP and NAPs COMP. II: Recovery and Sustainability of Depleted Fisheries
Environmental Information Management	• Decline in GCLME fish stocks • Uncertainty regarding ecosystem status • Deterioration in water quality • Habitat destruction and alteration	1) Sustainable Fisheries 2) High Quality Water to Sustain Balanced Ecosystem 3) Balanced Habitats for Sustainable Ecology and Environment	COMP. I: Finalize TDA, SAP and NAPs COMP. II: Recovery and Sustainability of Depleted Fisheries COMP. III: Planning for biodiversity conservation; restoration of degraded habitats COMP. IV: Reduce land- and sea-based pollution and improve water quality COMP. V: Regional coordination and institutional stability
Marine productivity assessment	• Decline in GCLME fish stocks Uncertainty regarding ecosystem status • Habitat destruction and alteration	1) Sustainable Fisheries 3) Balanced Habitats for Sustainable Ecology and Environment	COMP. I: Finalize TDA, SAP and NAPs COMP. II: Recovery and Sustainability of Depleted Fisheries
Nypa Palm Clearance and Mangrove restoration	• Uncertainty regarding ecosystem status • Habitat destruction and alteration	3) Balanced Habitats for Sustainable Ecology and Environment	COMP. III: Planning for biodiversity conservation; restoration of degraded habitats
Waste Stock exchange management system	• Deterioration in water quality Habitat destruction and alteration	2) High Quality Water to Sustain Balanced Ecosystem	COMP. IV: Reduce land- and sea-based pollution and improve water quality
Reduction of nutrient discharges	• Deterioration in water quality Habitat destruction and alteration	2) High Quality Water to Sustain Balanced Ecosystem 3) Balanced Habitats for Sustainable Ecology and Environment	COMP. IV: Reduce land- and sea-based pollution and improve water quality

ICARM for Kribe-Limbe Lagoon	• Deterioration in water quality Habitat destruction and alteration	3) Balanced Habitats for Sustainable Ecology and Environment	COMP. II: Recovery and Sustainability of Depleted Fisheries COMP. III: Planning for biodiversity conservation; restoration of degraded habitats COMP. IV: Reduce land- and sea-based pollution and improve water quality
Low-cost protection from coastal erosion	• Habitat destruction and alteration	3) Balanced Habitats for Sustainable Ecology and Environment	COMP. III: Planning for biodiversity conservation; restoration of degraded habitats
Protected area management	• Decline in GCLME fish stocks Uncertainty regarding ecosystem status • Deterioration in water quality • Habitat destruction and alteration	3) Balanced Habitats for Sustainable Ecology and Environment	COMP. III: Planning for biodiversity conservation; restoration of degraded habitats

Annex P provides more detailed written description of the Demonstration Projects.

COMPONENT I: FINALIZE TDA, SAP and NAPs AND DEVELOP SUSTAINABLE FINANCING MECHANISMS FOR SAP/NAP IMPLEMENTATION

58. **Objective:** Undertake strategic planning for concrete actions to develop sustainable fisheries, restore habitats and improve water quality in the GCLME, including the formulation of economic arrangements that will assure the sustainability of the action program.

59. **Subcomponents: Establish and maintain an ecosystem-wide pollution monitoring, assessment, and management system.**

Sub-Component: Fill data gaps and Update TDA

1.1 Identify and fill gaps for the TDA, including biodiversity (using existing Biodiversity National Action Plans, where available), socio-economic conditions, legal/regulatory review, stakeholder analysis, hot spots, contaminant levels, etc.

1.2 Fill gaps in regional pollution monitoring methods/standards/etc. e.g. by training and at-sea demonstrations for contaminant levels in water, sediments, and biota (must be done to support task 1.1 above)

1.3 Update TDA following filling of gaps

Sub-Component: SAP/NAP Finalization

1.4 Prepare and endorse National Action Plans (NAP) to fully operationalize SAP interventions at national level in each GCLME country

1.5 Finalize and endorse regional Strategic Action Programme

Sub-Component: SAP Financing and Sustainability

1.6 Hold a donors' conference to mobilize commitments to SAP implementation

1.7 Formulate arrangements for sustainable financing of environmental management of the GCLME, including economic instruments and incentives to promote preventive measures to decrease both land and sea-based sources of pollution as well as adequate environmental and living marine resources management in the region

60. The activities under Component I focus on filling priority gaps in technical knowledge of the transboundary problems in the GCLME, completing a concrete regional SAP, and formulating sustainable financing arrangements. The TDA will be updated as part of this component. A targeted SAP will also be developed and endorsed as a part of this component and commitments for its implementation will be obtained. However, Component I cannot be viewed as an independent activity, as Components II through V will support Component I by providing the institutional arrangements and the concrete actions required to provide information, data, and guidance to the TDA and SAP. Component I as written above merely establishes the overall framework for TDA/SAP/NAP development, but this process will be fed with concrete outcomes from Components II through V below.

61. **Outcomes:**

- TDA updated and widely disseminated
- NAPs and Regional SAP developed and endorsed
- Commitments to SAP implementation obtained
- Sustainable financing arrangements formulated
- Economic instruments and incentives developed

COMPONENT II: RECOVERY AND SUSTAINABILITY OF DEPLETED FISHERIES AND LIVING MARINE RESOURCES INCLUDING MARICULTURE

62. **Objective**: Establish an ecosystem-wide fisheries/LMR monitoring, assessment, and management system, fill technical gaps in understanding the current status of fisheries and take actions to aid in the recovery and sustainable use of living marine resources including development of mariculture in the GCLME (to support the TDA and SAP process)

63. **Subcomponents:**

2.1 Demonstrate regional stock assessment methods including regional surveys (Regional Demonstration Project on Fisheries)

2.2 Identify best methods and estimates for maximum sustainable yields for dominant commercially important fisheries species

2.3 Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project on Productivity)

2.4 Develop Regional Agreements and Regional Fisheries Commission

2.5 Assess and draft modifications to the National Legal Frameworks to achieve sustainable fisheries

2.6 Develop Fisheries Management Plans for at least three fisheries

2.7 Assess existing coastal aquaculture and mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP

64. Activities under this component focus on sustainable development of the GCLME fisheries and living marine resources. Methods to assess regional stocks and evaluate productivity will be demonstrated in order to gain a better understanding of the current status of the GCLME fisheries and living marine resources. The legal capacity for addressing the problem of over-exploitation of fisheries will be addressed through the drafting of modifications of national legal frameworks and the development of regional agreements and establishment of a GCLME Commission. The development of coastal aquaculture and mariculture will be facilitated through the identification of investments.

65. **Outcomes:**

- Regional surveys demonstrated and stock assessment mechanism developed
- Maximum sustainable yields estimated
- Capacity for conducting carrying capacity analyses developed and analyses conducted
- Regional agreements and Regional Fisheries Commission developed
- Modifications to National Legal Frameworks to achieve sustainable fisheries drafted
- Fisheries Management Plans developed for at least three fisheries
- Environmentally sustainable capacity for aquaculture and mariculture determined

COMPONENT III: PLANNING FOR BIODIVERSITY CONSERVATION, RESTORATION OF DEGRADED HABITATS AND DEVELOPMENT OF STRATEGIES FOR REDUCING COASTAL EROSION

66. **Objective:** Undertake strategic planning for conserving biodiversity and integrated coastal management, demonstrate activities to restore priority degraded habitats, and develop strategies for reducing coastal erosion in the GCLME region (to support the TDA and SAP process)

67. **Subcomponents:**

3.1 Develop Regional Biodiversity Action Plan, including Protected Areas based on Biodiversity Action Plans (National Demonstration Project on Protected Areas), building on existing and ongoing work of National Biodiversity Action Plans, where applicable.

3.2 Demonstrate restoration of priority mangrove areas (National Demonstration Project on mangrove restoration)

3.3 Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH) for habitat protection (National Demonstration Project on ICARM)

3.4 Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control

3.5 Perform gap analysis of national legislation and draft improvements to legislation regarding key elements of biodiversity identified in the TDA, introduced species and habitats, etc.

3.6 Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National Demonstration Project on shoreline erosion)

68. The activities in this component focus on undertaking strategic planning for and taking actions to conserve regional biodiversity and restore priority-degraded habitats. Under this component, a Regional Biodiversity Action Plan will be developed identifying priority biodiversity areas of concern. Marine and coastal biodiversity elements of already existing National Biodiversity Action Plans funded through GEF Enabling Activities will be utilized to avoid duplication. Priority mangrove areas, degraded critical habitats, will be restored as a national demonstration project. The legal basis for combating introduced species and for conserving biodiversity will be strengthened at the national level. Cost effective methods for addressing coastal erosion will be developed.

69. **Outcomes:**

- Regional Biodiversity Action Plan developed which builds on and complements existing NBSAPs
- Demonstration of restoration of priority mangrove areas completed
- Use of ICARM and PADH demonstrated
- Status of introduced species and their threats to the region's biodiversity assessed
- Modifications to national biodiversity laws drafted
- Mitigation strategies for restoring eroded coastal areas developed

COMPONENT IV: REDUCE LAND AND SEA-BASED POLLUTION AND IMPROVE WATER QUALITY

70. **Objective:** Develop strategic programmes for reducing land and sea-based sources of transboundary pollution and enhance regional ability to address wastes, oil spills, and other major marine pollution incidents (to support the TDA and SAP process).

71. **Subcomponents:**

4.1 Facilitate development of regionally-integrated and consistent National Programmes of Action for Land-Based Activities in the GCLME region, including updating inventories of pollution and habitat hot spots

4.2 Develop and implement a Regional Programme of Action for Land-Based Activities in the GCLME region

4.3 Develop and promote region-wide adoption of a protocol on LBA for the Abidjan Convention

4.4 Conduct a regional assessment of maritime pollution prevention measures, contingency planning, and spill response capabilities

4.5 Develop regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation)

4.6 Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL, OPRC) as related to oil and gas activities

4.7 Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (National Demonstration Project on Nutrient Reduction)

4.8 Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA (National Demonstration Project on Waste Stock Exchange)

72. The activities under this component focus on improving the regional ability to conduct strategic planning for and undertake actions to address the major transboundary problem of land and sea-based pollution and thereby improve water quality in the GCLME. This component will enhance national and regional abilities to address land-based sources of pollution through the creation of strategic programmes of action for implementation of the GPA at the national and regional level. The legal basis for addressing land-based sources of pollution will be improved through the formulation and adoption of a Protocol on Land-Based Activities for the 1981 Abidjan Convention. The regional ability to address marine-based sources of pollution will be enhanced through a review of current pollution prevention measures and spill response capabilities. Additionally, a regional system for cooperation in cases of marine pollution incidents will be created. Investment opportunities for implementing priority SAP activities related to land and sea-based sources of pollution will be developed.

73. **Outcomes:**

- Regional monitoring training and demonstrations conducted
- Regionally-integrated and consistent National Programmes of Action for Land-Based Activities developed
- Regional Programme of Action for Land-Based Activities developed and implemented
- LBA Protocol for the Abidjan Convention developed and adopted
- Regional assessment of marine pollution prevention measures, contingency planning and spill response capabilities completed
- Regional system for cooperation in cases of major marine pollution incidents created
- Legislative reforms in selected countries to adopt and implement international conventions related to oil and gas activities facilitated
- Investment opportunities for the SAP to reduce ecosystem threats developed

COMPONENT V: REGIONAL COORDINATION AND INSTITUTIONAL SUSTAINABILITY

74. **Objective:** Create a regional network with broad stakeholder participation and a sustainable institutional structure for addressing identified threats in the GCLME, including the development of a regional ecosystem commission and information system (this component will support the TDA and SAP process by providing the institutional arrangements for carrying out the project).

75. **Subcomponents:**

5.1 Develop regional project coordination mechanisms

5.2 Develop effective Steering Committees

5.3 Establish Intersectoral/ Interministerial/ Ministerial Coordination

5.4 Identify, strengthen and involve stakeholders

5.5 Develop Ecosystem Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project on Environmental Information Systems)

5.6 Project Monitoring and Evaluation (M&E)

5.7 Develop regional coordination mechanism through the establishment of an Interim Guinea Current Commission, followed by a full-time Commission

5.8 Provide capacity building for the IGCC

76. This component will create a functioning network of institutions and individuals to address the GCLME environmental issues and root causes; identify the process for evolving institutional arrangements from the support of the GEF to ownership by Region; and develop strategies to sustain the effective network of institutions and individuals to address the GCLME environmental issues and root causes. The Programme Coordinating Unit (PCU) will be instrumental in coordinating the implementation of all project activities as well as in securing the requisite amount of transnational and cross-institutional collaboration (international and regional organizations and donors) necessary to the success of the Project. It is envisaged that a Guinea Current Commission (GCC) would be constituted and adopted by the countries during the process of completion of the full SAP. Recognizing that negotiations leading to a legal entity such as the GCC will take time, the immediate creation of an Interim Guinea Current Commission (IGCC) would be explored as soon as implementation of the full project begins. The IGCC would have clearly defined roles and responsibilities to be described in the SAP. As the IGCC matures, it will increasingly take leadership of the project and, eventually, the PCU of the project will become the coordinating unit of the IGCC (later the GCC). The IGCC will be expected to play the key role in updating, as necessary, the agreed SAP as the project is implemented. This updating will be completed towards the end of the full project.

77. **Outcomes:**

- Regional project coordination mechanism
- Steering Committee developed
- Intersectoral/ Interministerial/ Ministerial Coordination established in each country
- Stakeholders actively involved in project activities
- GCLME Environmental Information System established
- Project monitoring and Evaluation conducted
- Regional coordination mechanism developed
- Capacity developed for the IGCC
- GEF Process, Stress Reduction and Environmental Status Indicator Framework

END OF PROJECT SITUATION (EXPECTED RESULTS)

78. The major expected results from completing the above five components and activities can be summarized as follows:

- Improved institutional structure to address priority regional issues, including a Guinea Current Commission, a Regional Fisheries Commission, and other regional and national bodies for conducting effective regional interventions for fisheries and biodiversity conservation and pollution prevention.

- Improved legal/management structure for addressing the priority regional issues, including a Protocol on Land Based Activities for the Abidjan Convention, a regional Biodiversity Action Plan, as well as legislative reforms for fisheries, land-based activities, and biodiversity
- Nine successful demonstration projects will serve as a basis for replication in the region and outside the region, as concrete steps towards achieving agreed environmental quality objectives.
- Nationally endorsed Strategic Action Program and NAPs with accompanying sustainable financing plan will lead the way towards continued incremental improvement to the GCLME based on a solid foundation of regional commitment and consensus

79. In addition to the major expected results above, the project will also result in:

- Improved knowledge assessment and actions toward recovery and sustainability of the current ecological status of the GCLME, including fish stocks and the priority transboundary concerns
- Enhanced regional political and stakeholder commitment to address priority transboundary problems through the development and preliminary implementation of a regional SAP
- Improved public participation in planning for and implementing activities to address the priority transboundary problems in the GCLME
- Increased ability to sustainably harvest living marine resources in the GCLME through improved legal basis, the development and implementation of fisheries monitoring, assessment and management plans, strengthened institutional capacity, and the assessment of mariculture carrying capacity
- Improved conservation of biodiversity and condition of priority habitats in the GCLME region through the development of a Regional Biodiversity Action Plan, demonstration projects, strengthened institutional capacity and an enhanced legal basis
- Enhanced regional capacity to mitigate eroded coastal areas
- Improved regional capacity to address land and sea-based pollution in the GCLME and thereby improve water quality through coordination, strategic planning, demonstration projects and an enhanced legal basis
- Effective coordination of project activities and preliminary SAP implementation through the establishment of a Regional Coordination Unit, Steering Committee and the development of a GCC
- Enhanced national and regional data and information acquisition, exchange and management systems to support decision-making

80. In order to achieve these results this project will be carried out in three major phases. First, assessments will be conducted to more accurately determine the current ecological status of the GCLME and its primary transboundary threats. This phase will be comprised of capacity building, assessments, and reviews of existing knowledge, combined with judicious and limited filling-in of the major gaps in knowledge and will result in an updated Transboundary Diagnostic Analysis. During the second phase, the Strategic Action Programme will be finalized. This phase will include development of management plans, agreements and strategies. The final phase of the project will include initial implementation of the agreed-upon SAP. An important part of the project is the implementation of identified regional and country demonstration projects that will facilitate early implementation of the SAP. It is understood that a consolidated effort undertaken in these initial six countries selected for the national demonstration projects will generate lessons that can be rapidly transferred and replicated throughout the region.

81. The TDA/NAP/SAP process, when completed will include the formulation of National (part of the NAP process) and Regional (part of the SAP process) Programmes of Action Land Based Activities. These NPAs and the RPA therefore will not be developed as a separate process, but rather as part of the

TDA/NAP/SAP process. The SAP will fully assess the impact of economic growth in the region, map out alternative development scenarios that protect global environmental resources, and enable the sixteen member states to reach a consensus on priorities, targets, programmes, and projects to protect the shared resources of the GCLME. The SAP will include an estimation of the required financial resources and a strategy to mobilize these resources. GEF investment project proposals to implement selected transboundary elements of the SAP will be prepared using the incremental cost approach. The SAP is expected to play a key role in ensuring that global environmental benefits are provided in tandem with the facilitation of sustainable and environmentally-sound economic development in the area over the coming decades. The process for the completion of the SAP will be designed to ensure that the SAP is action-oriented, locally owned, government supported, sustainable, and responsive to the local conditions. This, and the close attention to be paid to mobilizing resources for implementation of the SAP, will assure that it is implemented and not stored on shelves.

82. Leading to the completion and endorsement of the SAP, this Project will build on the concrete activities of Components II through V to provide information, data, and facilitation to the TDA/NAP/SAP process.

83. Table 3 outlines under which phases of the project the different subcomponents and their associated activities are included.

Table 3: Components and Phases of the Project

Component/Sub-Component	Update TDA	SAP Develop-ment	SAP Implemen-tation
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	√	√	√
Ia. Fill gaps in regional monitoring methods/standards/etc. by training and at-sea demonstrations for contaminant levels in water, sediments, and biota.	√		
Ib. Identify and fill gaps for the TDA, including biodiversity, socio-economic conditions, legal/regulatory review, stakeholder analysis, hot spots, contaminant levels, etc.	√		
Ic. Update TDA following filling of gaps.	√		
Id. Prepare and endorse National Action Plans.		√	
Ie. Finalize and endorse regional Strategic Action Programme.		√	
If. Hold a donors' conference to mobilize commitments to SAP implementation.		√	
Ig. Formulate arrangements for sustainable financing of environmental management of the GCLME.			√
Ih. Develop and recommend economic instruments and incentives to promote preventive measures to decrease both land and sea-based sources of pollution as well as adequate environmental management in the region.			√
II. Recovery and sustainability of depleted fisheries and living marine resources including mariculture. (supporting Component I)	√	√	√
IIa. Demonstrate regional stock assessment methods, including regional surveys (Regional Demonstration Project)			√
IIb. Identify and utilize optimal methods and estimates for maximum sustainable yields for dominant commercially important fisheries species.			√
IIc. Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project).	√		
IId. Develop Regional Agreements and Regional Fisheries Commission			√
IIe. Assess and draft modifications to the national legal Frameworks to achieve sustainable fisheries.			√
IIf. Develop Fisheries Management Plans for at least three fisheries.		√	
IIg. Assess existing coastal aquaculture and mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP.			√

Component/Sub-Component	Update TDA	SAP Develop-ment	SAP Implemen-tation
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion. (Supporting Component I)	√	√	√
IIIa. Develop Regional biodiversity Action Plan, including Protected Areas based on Biodiversity Action Plans (National Demonstration Project).		√	
IIIb. Demonstrate restoration of priority mangrove areas (National Demonstration Project).			√
IIIc. Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH) for habitat protection (National Demonstration Project).			√
IIId. Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control.	√	√	
IIIe. Perform gap analysis of national legislation and draft improvements to legislation regarding key elements of biodiversity identified in the TDA, introduced species and habitats, etc.			√
IIIf. Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National Demonstration Proejct).			√
IV. Reduce land and sea-based pollution and improve water quality (supporting Component I)	√	√	√
IVa. Facilitate development of regionally integrated and consistent National Programmes of Action for Land-Based Activities, including updating inventories of pollution and habitat hot spots.		√	
IVb. Develop and implement a Regional Programme of Action for Land-Based Activities.		√	√
IVc. Develop a protocol on LBA for the Abidjan Convention			√
IVd. Conduct a regional assessment of maritime pollution prevention measures, contingency planning, and spill response capabilities.	√	√	
IVe. Develop regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation).			√
IVf. Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL< OPRC) as related to oil and gas activities.		√	
IVg. Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (national Demonstration Project).			√
IVh. Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA.			√
V. Regional coordination and institutional sustainability. (supporting Component I)	√	√	√
Va. Develop a regional project coordination mechanism.		√	
Vb. Develop effective Steering Committee.		√	
Vc. Establish Intersectoral/Interministerial/Ministerial Coordination.		√	
Vd. Identify, strengthen and involve stakeholders.		√	√
Ve. Develop Environmental Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project).	√	√	√
Vf. Monitoring and Evaluation (M&E)		√	
Vg. Develop regional coordination mechanism (an Interim Guinea Current Commission, followed by a full-time Commission).			√
Vh. Provide capacity building for the IGCC.			√

84. The project approach will thus extend the introduction of ecosystem-based assessment and management from the areas adjacent to the countries that participated in the Pilot Phase, to the full extent of the influence of the Guinea Current LME, from Guinea-Bissau in the northwest, to Angola in the

south. The proposed demonstration projects will contribute directly to the implementation of the Pilot Phase Project modular approach to ecosystem: 1) productivity, 2) fish and fisheries and other living resources, 3) pollution and ecosystem health, 4) socio-economics, and 5) governance. The projects will also contribute and facilitate the NEPAD's Environmental Action Plan implementation as well as contribute to the revitalization of the Abidjan Conventions by bringing harmonized environmental management efforts in combination with economic development and poverty alleviation. The project will maintain close linkages with mechanisms developed to address land and water-related environmental issues in the major river basins draining to the LME (Volta, Niger) and the neighboring GEF International Waters projects (Canary Current, Benguela Current). It will support the regional implementation of the Global Programme of Action for Protection of the Marine Environment from Land-Based Activities, relevant components of the Abidjan Convention and those of the Accra Ministerial Declaration.

85. The Workplan for these Components and Activities is presented below in Table 4. A full implementation plan will be developed by the staff of the Regional Coordination Unit immediately upon beginning its operation and will be submitted to the project Steering Committee for adoption.

Table 4. Workplan and Timetable

Component / Sub-Component	GCLME Project Implementation									
	Year 1		Year 2		Year 3		Year 4		Year 5	
I. Finalize SAP and develop sustainable financing mechanisms for its implementation										
Ia. Fill gaps in regional monitoring methods/standards/etc. by training and at-sea demonstrations for contaminant levels in water, sediments, and biota.										
Ib. Identify and fill gaps for the TDA, including biodiversity, socio-economic conditions, legal/regulatory review, stakeholder analysis, hot spots, contaminant levels, etc.										
Ic. Update TDA following filling of gaps.										
Id. Prepare and endorse National Action Plans.										
Ie. Finalize and endorse regional Strategic Action Programme.										
If. Hold a donors' conference to mobilize commitments to SAP implementation.										
Ig. Formulate arrangements for sustainable financing of environmental management of the GCLME; Develop and recommend economic instruments and incentives to promote preventive measures to decrease both land and sea-based sources of pollution as well as adequate environmental management in the region										
II. Recovery and sustainability of depleted fisheries and living marine resources including mariculture.										
IIa. Demonstrate regional stock assessment methods, including regional surveys (Regional Demonstration Project)										
IIb. Identify and utilize methods and estimates for maximum sustainable yields for dominant commercially important fisheries species.										
IIc. Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project).										
IId. Develop Regional Agreements and Regional Fisheries Commission										
IIe. Assess and draft modifications to the national legal Frameworks to achieve sustainable fisheries.										
IIf. Develop Fisheries Management Plans for at least three fisheries.										
IIg. Assess existing coastal aquaculture and Mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP.										
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion.										

Component / Sub-Component	GCLME Project Implementation									
	Year 1		Year 2		Year 3		Year 4		Year 5	
IIIa. Develop Regional biodiversity Action Plan, including Protected Areas based on Biodiversity Action Plans (National Demonstration Project).										
IIIb. Demonstrate restoration of priority mangrove areas (National Demonstration Project).										
IIIc. Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH) for habitat protection (National Demonstration Project).										
IIId. Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control.										
IIIe. Perform gap analysis of national legislation, and draft improvements to legislation regarding key elements of biodiversity identified in the TDA, introduced species and habitats, etc.										
IIIf. Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National Demonstration Proejct).										
IV. Reduce land and sea-based pollution and improve water quality										
IVa. Facilitate development of regionally integrated and consistent National Programmes of Action for Land-Based Activities, including updating inventories of pollution and habitat hot spots.										
IVb. Develop and implement a Regional Programme of Action for Land-Based Activities.										
IVc. Develop a protocol on LBA for the Abidjan Convention										
IVd. Conduct a regional assessment of maritime pollution prevention measures, contingency planning, and spill response capabilities.										
IVe. Development of regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation).										
IVf. Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL< OPRC) as related to oil and gas activities.										
IVg. Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (national Demonstration Project).										
IVh. Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA.										

Component / Sub-Component	GCLME Project Implementation									
	Year 1		Year 2		Year 3		Year 4		Year 5	
V. Regional coordination and institutional sustainability.										
Va. Develop a regional project coordination mechanism.										
Vb. Develop effective Steering Committee.										
Vc. Establish Intersectoral/Interministerial/Ministerial Coordination.										
Vd. Identify, strengthen and involve stakeholders.										
Ve. Develop Environmental Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project).										
Vf. Monitoring and Evaluation (M&E)										
Vg. Develop regional coordination mechanism (an Interim Guinea Current Commission, followed by a full-time Commission).										
Vh. Provide capacity building for the IGCC.										

TARGET BENEFICIARIES

86. The primary target beneficiary of this project is the population of the Guinea Current countries, in particular the fishing communities with an emphasis on women (as reflected by the Stakeholding process). The project will contribute to the reduction of poverty in the region, by providing a roadmap to sustainable coastal riparian fisheries, and therefore to continued availability of a primary food source for the coastal population. The coastal zone population should benefit from each of the success criteria, which are expected to be rehabilitation of the fishery resources, sustainable aquaculture/mariculture, improved biodiversity protection, protected/restored habitats, improved water quality, and reduced rates of coastal erosion. Successful implementation of the GCLME should have direct benefits in terms of the improvement and protection of public health, of livelihoods of the local communities, and of the general quality of the coastal zone. Through these achievements, tourists in the region will enjoy clean and aesthetically pleasing recreational facilities. In the short-term, governments and institutions will benefit from institutional strengthening as a result of networking, training programmes, the provision of key items of equipment, and in particular from the development of GCLME SAP. Proper environmental assessments and pre-investment studies should facilitate the release of vital credits for improving waste management and for stimulating the development of key sectors.

87. The direct recipients of the project objectives will be:

- People of the region
- Governments of the region;
- National Focal Points;
- regional scientific and technical organizations;
- national, local and municipal governments in cooperating countries;
- technical organizations, universities, research institutes and private sector organizations (tourism, agriculture, fisheries, oil and gas industry, environmental consultancy firms, etc. in coastal states); and
- non-governmental organizations concerned with environmental management and conservation of natural resources.

88. The target beneficiaries will be:

- the resident population, and especially women, of the Guinea Current coastal zone, who will benefit from enhanced fishery resources (both as food and income supply), improved water quality, recreational opportunities (both at personal as well as income generating levels) and strengthened protection and management of natural habitats, improved basic access to food, sustainable income and livelihoods, and enhanced condition of and opportunities for women;
- fishermen whose livelihoods will benefit from the improved environmental quality as the result of the reduced transport of pollutants to the sea following implementation of new policies and investments; in addition, they will benefit from the sustainable management of the GCLME fisheries;
- regional tourists who visit the GCLME coastal zone and adjacent areas for a wide range of purposes;
- future generations of the human population both within and beyond region who will benefit from the opportunities created by the conservation of biodiversity in the region - the present project enables the present generations to respect the rights of future ones instead of transferring the consequences of irrational development to them; and
- the world population at large will benefit through the direct contribution made to the improvement of an important international water body and the demonstration effect which this project will have for other regional seas.

RISKS AND SUSTAINABILITY

89. The long-term success of regional-scale marine ecosystem management programs, such as the one proposed here depend, *inter ali*a, on the political willingness of the participating countries to cooperate, their willingness to continue project programs and approaches after the life of the GEF intervention, and the extent to which activities successfully engage system users of the resources that are the subject of intervention. For the long-term sustainability of the GCLME Program, it will be necessary for governments to have a clear vision that the benefits they will derive from the GCC and their own further investment in the project will be far greater than the costs which would accrue to them if these mechanisms were not in place.

90. In relation to political willingness, the level of project risk is seen as low/moderate in all of the countries. It might well have been expected that civil strife in Congo Democratic Republic, cote d' Ivoire and Liberia would have resulted in an uneven commitment of these countries to this project. This has not been the case, however. Interministerial involvement on the part of Congo Democratic Republic, Cote d' Ivoire and Liberia have been strong at every major meeting of the GCLME. There is a growing realization on the part of the countries that ecosystem sustainability is inextricably linked to food production, tourism, sanitation, population movements, and thus regional stability. The countries recognize that their ability to craft an integrated approach to the GCLME is therefore crucial to the development and maintenance of regional stability. The explicit commitment made by the sixteen countries through the contributions to the GEF MSP within the NEPAD environmental action plan in raising political awareness in the region, as well as actions already undertaken at the country levels, are the best indicators of the sound foundation for this project. Another strong indicator for regional commitment is regional participation in other initiatives including UNEP regional seas programme West and Central African Action Plan, the NEPAD coastal and marine environmental action plan and the FAO Central Eastern Atlantic Fisheries Commission (CECAF).

91. In addition to working closely with the regional initiatives discussed above, the present project will maintain close linkages with mechanisms developed to address land and water-related environmental issues in the major river basins draining into the LME (Volta, Niger) and the neighboring GEF International Waters projects (Canary Current, Benguela Current). It will support the regional implementation of the Global Programme of Action for Protection of the Marine Environment from Land-Based Activities, relevant components of the Abidjan Convention and those of the Accra Ministerial Declaration.

92. The risk of this GEF-initiated program and activities related to it ending after the life of the project are also seen as low. Country completion of the TDA, a jointly undertaken interministerial exercise characterized by strong cooperation and openness, led to the creation of the preliminary SAP. It is recognized that negotiations necessary to create the permanent Guinea Current Commission will take some time, perhaps as long as the project itself. Recognizing this, the countries have pledged themselves to immediately create the Interim Guinea Current Commission (IGCC) that will have specified functions and responsibilities. The countries will seek to adopt, through their appropriate national mechanisms, country specific policy/ institutional/legal reforms necessary to implement the agreed-upon recommendations of the IGCC.

93. Sustainability will also be enhanced by a progressive transfer of project leadership, overall project management and outcome production directly to the country-formed IGCC and, later, the GCC. The IGCC and eventually the GCC will assume the leadership role for the project as those institutions are formed and mature. The existing PCU would at that time become the Commission core Secretariat, with additional staff resources being provided by the countries themselves as deemed necessary by the Commission and the countries.

94. As a further demonstration of the regional commitment, the third meeting of the Steering Committee of GCLME, held in Abuja, Nigeria in June 2003, provided agreement on the following:

- The Meeting accepted the conclusions and recommendations of the 2nd Regional Technical and Scientific Task Team Workshop, including the Project Brief, TDA, preliminary SAP and the Project Budget, as modified during the Workshop and Meeting.
- The Meeting requested a one-page summary of the Interministerial Coordination process within each country.
- The Meeting agreed that this GEF project will provide a basis for a sustainable Regional Coordination Mechanism, for which the countries agreed to take financial responsibility at an appropriate time.
- The Meeting agreed that the Countries should proceed expeditiously towards a decision on the location of the PCU and the Chairs of the Working Groups.

95. The countries' ownership of the project is also shown by the endorsement of the GEF Project Brief. The countries have committed significant financial resources in support of the project, including in-kind contributions. The governments will also provide necessary scientific expertise to the GCLME Project from the national organizations, at-sea facilities for data collection, ship time, and meeting space as required.

GEF ELIGIBILITY

96. All 16 participating countries are eligible for GEF assistance under paragraph 9b of the Instrument for the Restructured GEF. GEF's Operational Programme No. 9 "Integrated Land and Water Multiple Focal Area", states that *"the goal is to help groups of countries utilise the full range of technical, economic, financial, regulatory, and institutional measures needed to operationalize the sustainable development strategies for international waters.* (para 9.2)" Further, this OP lists as an expected outcome *"the reduction of stress to the international waters environment in selected parts of all five development regions across the globe through participating countries making changes in their sectoral policies, making critical investments, developing necessary programs and collaborating jointly in implementing ... water resources protection measures* (para 9.10)".

97. The proposed project will help the riparian countries of the GCLME to overcome institutional and other barriers to collaboration. The proposed project coordinates among implementing agencies, regional development banks, countries, and other stakeholders, and generates programmatic benefits for the global environment that would not otherwise be achievable. GEF funds will support completion of the SAP. The process for completing the SAP will involve international donors, national and local governmental institutions, industries, and other key stakeholders that have important actions to take in restoring and protecting the GCLME environment.

STAKEHOLDER PARTICIPATION

98. Stakeholder involvement has been recognized as an integral part of the development phase of the GCLME Program and will continue to be emphasized during the implementation of the Program. The seed for the GCLME Program was sown at the first Symposium of the Gulf of Guinea LME project in Abidjan, Cote d'Ivoire in 1998 and later endorsed by the Council of Ministers meeting in June 1998 in Accra Ghana. This endorsement paved the way for the development of a PDF Block B Grant Proposal to GEF, and its subsequent approval and implementation in 2001 to 2003. In May 2001 the First Regional GCLME Stocktaking Workshop, attended by approximately 100 stakeholders and regional and international experts, was held in Accra, followed by a formal meeting of key stakeholders. The attendance and proceedings of this workshop are attached to this document as Annex N.

99. A stakeholder participation plan for the GCLME Program is attached as Annex F. It indicates how the various stakeholders will be involved and at what stages. In order to attain sustainability, the activities are designed to address interests of large groups of stakeholders, and a significant portion of the budget is designed for this task. Major stakeholders in this project include: public sector, local government authorities, non-governmental organizations, professionals, civil society and the public including fisher-folk.

PROJECT IMPLEMENTATION, INSTITUTIONAL FRAMEWORK AND NATIONAL AND REGIONAL INSTITUTIONS

100. Project Implementation. This project will be jointly implemented by UNDP and UNEP. This arrangement has been made in order to benefit from the comparative advantages of both organizations, each of which has large GEF International Waters portfolios utilizing the TDA/SAP approach to the protection and remediation of transboundary waterbodies. Specifically, UNDP will serve as IA for components: II (all); III-B, D, F; V-A, B, C, D, F. UNEP will serve as IA for components: I (all); III-A, C, E; IV (all); V-E, G, H. The resultant financial allocations for each agency, by Tranche, are as follows:

Implementing Agency	Total
UNDP	$11,712,705
UNEP	$9,099,699
Total	$20,812,404

101. The United Nations Industrial Development Organization (UNIDO) will be the Executing Agency for the project and in this capacity will seek to ensure that the sixteen GCLME countries work in concert with the regions' other GEF projects, as well as other bilateral and multilateral donor agencies in the region to define and address transboundary priority environmental issues within the framework of their existing responsibilities under the Abidjan Convention and relevant components of NEPAD.

102. The host country for the PCU will be determined based on criteria adopted by the Project Steering Committee. This process will begin once the Project Brief is accepted, and prior to the completion of the Project Document.

103. UNIDO, in consultation with UNDP and UNEP, will competitively recruit a full-time Chief Technical Advisor and other Senior Project Staff consistent with standard UNDP/UNEP procedures. The CTA will facilitate the successful execution of project activities. He/She will be responsible for the co-ordination of the day-to-day project activities and will assist governments of participating countries to provide expeditiously their respective inputs to the project.

104. UNIDO will explore the possibility of developing an MOU with IW: LEARN to assist the GCLME in accessing GEF LME experiences and information and for dissemination of lessons learned to the wider GEF community. Under the MOU, IW: LEARN will develop a Technical Support Facility to provide knowledge products and distance learning tools to serve the GCLME and other GEF IW projects in the region. Joint Operational Agreements specifying workplan, sustainability, implementation and cost-sharing arrangements will be developed as necessary for execution of identified joint pilot demonstration activities.

105. UNEP will continue to support the GCLME project through the Secretariat of the Abidjan Convention and the Chair of the Steering Committee of the Abidjan Convention. With regard to the Convention, UNEP will ensure complementarity between the specific targets of the project and the wider objectives of the WACAF Action Plan, especially as it concerns the updating of elements of the Abidjan Convention in line with recent realities (e.g. new International Conventions, new memberships, etc) and the development of additional Protocols in support of the Convention. UNEP and UNDP will, in addition, ensure effective liaison among the GCLME, CCLME and BCLME Projects, which together provide coverage for the geographic area defined by the Abidjan Convention. UNEP and UNDP will also be responsible for ensuring complementarity between, and leveraging necessary inputs from, pertinent ongoing GEF, World Bank, UNDP, UNEP, bilateral and multilateral regional and national projects within the GCLME, including those being executed by NGO's and the private sector.

106. US-NOAA will contribute scientific and technical assistance to the project in partnership with UNIDO, UNDP and UNEP. Participating US-NOAA staff will be sharing their considerable experience in ecosystem-based assessment and management practices with key persons from the recipient countries.

107. Institutional arrangements for this project are presented as Annex I. This schematic illustrates the participation of the Project Steering Committee, the Stakeholders, the PCU, and other parties in the Project.

108. The Regional Project Steering Committee which was formed during the Block-B Process and consists of one high-level official country representative from each of the sixteen countries, one representative each from AU (STRC) and AfDB, US-NOAA, the Centre for Environment and Development in Africa, Benin, (CEDA) and the Foundation for Environmental Development and Education in Nigeria (FEDEN) (representing NGO's, CBO's and the Civil Society), and representatives of the Implementing/Executing Agencies (UNDP, UNEP, UNIDO), will oversee the implementation of the full project. The Steering Committee will meet once a year to, inter alia, constitute and define TOR's for regional and national Scientific/Technical Advisory Committees, define modalities for setting up the country Inter-ministerial Committees, and formulate a Work Plan and Timetable for the Activities scheduled during the year. There will also be a ministerial level, inter-agency and institutional coordinating committee (Council of Ministers) which will meet annually to ensure that maximum use is made of the combined resources of the agencies and institutions with associated projects and to minimize duplication of effort. Participating agencies will include as invitees, among others, the signatories to the SAP.

109. Project Co-ordination and Management are concerned with regional co-ordination of the implementation of the project and related activities. Initial actions include: appointment of project staff; nomination of Government representatives to the Project Steering Committee and convening of the first meeting to agree on the framework master plan for project management and execution; appointment of National Focal Points to Chair the National Inter-ministerial Steering Committees and initial country visits by the regional co-ordination staff to meet with the National Steering Committees to prepare national workplans and budgets. In addition, particular attention will be paid to establishing strong linkages with the GEF BCLME and GEF Volta Basin and Niger Basin projects, among others.

110. The country Inter-ministerial Committees, whose main task is to promote and give validity to the cross-sectoral approach implied in the LME concept at the national level, will meet on an as-needed basis to be informed of the work of the Regional Steering Committee, to review the progress of national Scientific/Technical Advisory Committees charged with the implementation of project activities at the country level, and to facilitate important country political level commitment to the implementation of the project including sourcing for donor support.

111. The composition and functioning of the regional and national Scientific/Technical Advisory Committees is crucial to the success of the project. The demonstration projects for national execution in the six pilot phase countries will be placed under the supervision of the national Inter-ministerial Committees while the 3 regional demonstration projects will be ecosystem-wide, embracing all sixteen GCLME countries and guided by the Regional Project Steering Committee. The Regional Project Steering Committee will also maintain oversight of the implementation of the national demonstration projects.

112. Direct and ongoing oversight of project activities will be the responsibility of the PCU, with a planned transition of Steering Committee and Secretariat (PCU) to the IGCC and, upon ratification of a formal legal mechanism, the GCC. The Staff of the PCU will be responsible for maintaining a regional "flavour" in all country-level demonstration projects. The PCU will be comprised of a Chief Technical Advisor, four senior level technical experts, and requisite administrative and secretarial support. Consultants will be retained as necessary and priority will be given to the recruitment of consultants from the participating countries, as available.

INCREMENTAL COSTS AND PROJECT FINANCING.

113. The overall cost of the project is US$55.321 million. GEF financing is in the amount US$21.449 million. Co-finance from National Governments, private industry, US-NOAA ($600k), Partner UN Agencies, and the Government of Norway ($2.084 million) are in the amount US$33.871 million. The amount disbursed within each country will be dependent on a number of factors including competitive bidding for contracts and the availability of qualified consultants required for specific project activities. Full details of the cost of the project, including information related to the baseline, are to be found in Annex G.

Table 5: Summary of Project Financing (US$)

Project Components	Co-financing Govts'	Co-financing other source	GEF Financing
1: Finalize SAP and develop sustainable financing mechanisms for its implementation.	1,408,500	0	2,491,995
2: Recovery and sustainability of depleted fisheries and living marine resources including mariculture.	5,235,532	645,200	3,671,669
3: Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion.	9,994,900	45,200	4,253,482
4: Reduce land and sea-based pollution and improve water quality.	11,846,110	1,826,050	2,711,181
5. Regional coordination and institutional sustainability.	**1,376,400**	998,400	6,693,009
TOTALS	**30,356,442**	**3,514,850**	**19,821,336**
PDF (B)			637,000
UNIDO Support Costs (5%)			991,067
Total Project Financing	**30,356,442**	**3,514,850**	**21,449,404**

114. The incremental costs analysis is presented in summary in Table 6 below, and is based on the component costs and the discussion contained in Annex A. Annex A discusses the baseline activities, the alternative scenario, the domestic and global benefits of each, and provides the level of funding.

Table 6: Summary of Baseline and Incremental Costs

Component	Baseline (B)	Alternative (A)	Country co-finance	Other co-finance	GEF finance
1: Finalize SAP and develop sustainable financing mechanisms for	**7,076,000**	**10,976,496**	**1,408,500**	**0**	**2,491,996**
2: Recovery and sustainability of depleted fisheries and living marine resources including mariculture.	**13,598,551**	**23,150,952**	**5,235,532**	**645,200**	**3,671,668**

3: Planning for biodiversity conservation, restoration of degraded habitats and development	**552,266,237**	**566,559,819**	**9,994,900**	**45,200**	**4,253,481**
4. Reduce land and sea-based pollution and improve water quality.	**220,773,112**	**237,156,453**	**11,846,110**	**1,826,050**	**2,711,180**
5. Regional coordination and institutional sustainability.	**6,272,200**	**15,340,009**	**1,376,400**	**998,400**	**6,693,008**
PDF-B					**637,000**
UNIDO					**991,067**
TOTAL PROJECT	**$799,986,100**	**855,300,796**	**30,356,442**	**3,514,850**	**21,449,404**

MONITORING AND EVALUATION

115. Monitoring and Evaluation include a series of linked activities, including a complete Project Document, Project Implementation Review (PIR), Tripartite Reviews, Annual and Quarterly Project Reports (and thence to the GEF Project Implementation Review Process), Work Plan, and independent mid-term and final project Evaluations (see Table 7). Monitoring and evaluation begins with preparation of the Project Document, complete with logical framework matrix (LogFrame) developed according to strict M&E procedures, including clear indicators of implementation progress and means of verification. This Project Brief includes the required LogFrame matrix with progress indicators and verifiers.

116. Project objectives, outcomes and emerging issues will be regularly reviewed and evaluated annually by the PSC. Reporting (annual and quarterly) will be done in accordance with UNDP, UNEP and GEF rules and regulations. The annual programme/project report (APR) is designed to obtain the independent views of the main stakeholders of a project on its relevance, performance and the likelihood of its success. The APR form has two parts. Part I asks for a numerical rating of project relevance and performance as well as an overall rating of the project. Part II asks for a textual assessment of the project, focusing on major achievements, early evidence of success, issues and problems, recommendations and lessons learned. The APR will be prepared by the Chief Technical Adviser, after consultation with the relevant Stakeholders, and will be submitted to the UNIDO for certification and the Principal Project Representative (PPR), the UNDP Resident Representative in the PCU host country, for approval. Quarterly progress reports will be prepared in the same procedures. The Stakeholder review will focus on the logical framework matrix and the performance indicators. Stakeholders could include a letter to the PPR that they have been consulted and their views taken into account.

117. The project will be subject to the various evaluation and review mechanisms of the UNDP and UNEP, including, the Tri-Partite Review (TPR), and an external Evaluation and Final Report prior to termination of the Project. The project will also participate in the annual Project Implementation Review (PIR) of the GEF. The PIR is mandatory for all GEF projects that have been under implementation for at least a year at the time that the exercise is conducted. Particular emphasis will be given to emerging GEF policy with regard to monitoring and evaluation in the context of GEF IW projects. Relevant Process Indicators, Stress Reduction Indicators, and Environmental Status Indicators will be developed that will serve to inform the M&E process and be adopted by the participating countries as tools for long-term monitoring of SAP implementation. These three indicators will be more explicitly identified and incorporated into the project as project outcomes during year one of the project,

and completion of the negotiations necessary to form the GCC would be a Process Indicator at the end of the project. Another especially important Process Indicator will be the updated SAP that will be created towards the end of the project. The project logframe has been specifically designed in a way that lends itself to the straightforward identification of Process, Stress Reduction, and Environmental Status Indicators.

118. **During year one of the project, the PCU will identify the relevant Process Indicators (PIs), Stress Reduction Indicators (SRIs) and Environmental Status Indicators (ESIs) relevant to the SAP/EQOs and these would be used to monitor the project and SAP implementation starting in year two. These indicators will be reviewed, as part of the initial monitoring and evaluation exercise and upon their adoption will become a basis for the ongoing SAP monitoring and evaluation process.** The Logframe Analysis incorporated into the Project Brief and this Project Document shall be used in significant measure to assist in the identification of the relevant indicators. It is expected that as with many other GEF IW projects, many of the indicators to be employed during the life of the project will be PIs. These would include, *inter ali*a, such indicators as the establishment and successful functioning of the IGCC, active negotiations leading to the eventual GCC, State of the Ecosystem Reports, the establishment and effective functioning of Inter-Ministerial Committees (IMCs), and work to assess the extent and condition of non-harvested species (e.g. policy, legal, institutional reforms etc). SRIs might include, *inter ali*a, implementation of recommendations and agreements regarding the harvesting levels of specific stocks, improved forecasting techniques with resulting positive environmental, economic and social benefits for the participating countries, explicit measures for the protection of vulnerable species, and improved predictability of the GCLME resulting in decreased levels of uncertainty of management decisions taken both nationally and regionally. While ESIs are likely to become more apparent after the life of the GEF project, there are likely to be some ESIs that are likely to be realized during implementation. These ESIs would include, *inter ali*a, the establishment of protected areas, reduced pressure on, and documented healthier stocks of vulnerable species and measurable improvement of water quality in those areas selected for pilot activities in identified hotspots (e.g. cleaner waters/sediments, restored habitats, sustainably managed fisheries etc). The development of indicators is part of the GCLME Strategic Action Programme (SAP) Process. The project would also develop by year three a baseline illustrating activities completed from which the progress towards achieving the stated Environmental Quality Objectives would be measured.

119. In addition to the monitoring and evaluation described above, independent monitoring of the project will be undertaken by a contracted supervision firm, using a balanced group of experts selected by UNIDO, UNEP and UNDP. The extensive experience by UNIDO, UNEP and UNDP in monitoring large programs will be drawn upon to ensure that the project activities are carefully documented. There will be two evaluation periods, one at mid-term and another at the end of the Program.

120. The mid-term review will focus on relevance, performance (effectiveness, efficiency and timeliness), issues requiring decisions and actions and initial lessons learned about project design, implementation and management. The final evaluation will focus on similar issues as the mid-term evaluation but will also look at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. Recommendations on follow-up activities will also be provided.

121. Approximately **US$300,000** will be allocated for monitoring and evaluation (M&E) and Tri- partite Reviews (TPRs) that will be undertaken by independent experts and UNDP & UNEP. This figure will be the subject of ongoing review and budgetary adjustments will be made as necessary. The evaluation process will be carried out according to standard procedures and formats in line with GEF requirements. The process will include the collection and analysis of data on the Program and its various projects including an overall assessment, the achievement of clearly defined objectives and performance with verifiable indicators, annual reviews, and description and analysis of stakeholder participation in the Program design and implementation. Explanations will be given on how the monitoring and evaluation results will be used to adjust the implementation of the Program if required and to replicate the results throughout the region. As far as possible, the M&E process will be measured

according to a detailed workplan and a Logical Framework Analysis approach developed and tabulated in the project document.

122. In addition to the standard UNIDO, UNDP, UNEP and GEF procedures outlined above, the project will benefit from (at minimum) annual Project Steering Committee Meetings (PSC). The PSC is the primary policy-making body for the GCLME project. The CTA will schedule and report on the Steering Committee Meetings.

123. Meetings can also be organized ad hoc at the request of the CTA and/or on request by a majority of the participating countries. The Steering Committee will approve the final results of such meetings.

124. In summary tabular form, the M&E Process for the GCLME will be as follows:

Table 7. M&E Activities, Timeframes and Responsibilities

Activity	Responsibilities	Timeframes
1. Drafting Project Planning Documents: Prodoc, LogFrame (including indicators), M&E Plan	UNIDO, UNDP, UNEP staff and consultants and other pertinent stakeholders	During project design stage
2. M&E Plan	UNIDO, UNDP, UNEP, project development specialists	During project design stage
3. Work Plan	CTA, with UNIDO, UNEP and UNDP	Annually (first year: inception report)
4. Quarterly Operational Reports (QORs)	UNIDO and PPR	Quarterly
5. Annual Programme/ Project Reports (APRs)	The Steering Committee, working closely with UNIDO and the CTA in consultation with Project stakeholders	Annually
6. Tripartite Review (TPR)	Governments, UNIDO, UNDP, UNEP, project team, beneficiaries and other stakeholders	Annually
7. Project Implementation Review (PIR)	UNIDO, UNDP, UNEP, project team, GEF's M&E team	Annually, between June and September
8. Mid-term and Final evaluations	UNIDO, UNDP, UNEP, project team, independent evaluators	At the mid-point and end of project implementation.
9. Terminal Report	UNDP Country Office, CTA	At least one month before the end of the project

LESSONS LEARNED AND TECHNICAL REVIEWS

125. Just as in the pilot phase project, the GCLME project will be involved from the start in the GEF International Waters Learning Exchange and Resources Network Program (IW: LEARN). IW: LEARN is a distance education program whose objective is to strengthen the management of International Waters by facilitating information sharing and learning among Transboundary Waters Management (TWM) constituencies. IW: LEARN will improve GEF IW projects' information base, replication efficiency, transparency, stakeholder ownership and sustainability of benefits through:

A. Facilitation of access to information on transboundary water resources among GEF IW projects
B. Structured learning among GEF IW projects and cooperating partners
C. Biennial International Waters Conferences
D. Testing innovative approaches to strengthen implementation of the IW portfolio
E. Fostering partnerships to sustain benefits of IW: LEARN and associated technical support

Many of the ideas presented in this Project Brief have benefited from lessons learned from past GEF International Waters projects. These ideas cover project implementation modality, the M&E Process, the identification of objectives and tasks, and the public participation component. The project would seek (and also

fund) assistance of IW: LEARN in the development of a standard website following the IW: LEARN listed criteria as well as an information dissemination tool based on the Distance Learning Information Sharing Tool (DLIST) methodology developed by IW: LEARN/World Bank and ECOAfrica.

LIST OF ANNEXES

Required Annexes:

Annex A. **Incremental Cost Annex**
Annex B. **Logframe Matrix**
Annex C. **STAP Roster Technical Review**
Annex C1. **Implementing Agency Response to STAP/IA Comments**

Optional Annexes:

Annex D **Detailed List of Activities**

Annex E **Preliminary Transboundary Diagnostic Analysis**

(Separate document.)

Annex F **Public Involvement Plan Summary**

Summary of how various Stakeholders will be involved in the GCLME, including governance, management, and implementation, along with reference to the major Objectives/Components where their participation is identified.

Annex G **Baseline Activities and Co-financing**

Based on input from the countries, as well as UNIDO, UNEP and UNDP, the baseline and co-financing were identified to assist in the Incremental Cost Analysis.

Annex H **List of Publications Prepared During the PDF-B**

Published materials available describing the process and steps taken to develop the Preliminary TDA and the Project Brief.

Annex I **Institutional Arrangements**

Schematic of the Implementation Structure for the GCLME, including governance, management, regional activities, and national activities.

Annex J **Copies of GEF Operational Focal Point Endorsement Letters**

Annex K **Summary of Final Review of Pilot Phase GGLME**

Annex L **Accra Declaration**

Annex M **Ministers' letter to GEF requesting full project support**

Annex N **Accra Meeting participants and conclusions**

Annex O **Copies of Government, UN and other donor co-financing commitments**

Annex P **Demonstration project summaries**

ANNEX A

INCREMENTAL COST ANALYSIS

Broad Development Goal

A1. The countries bordering the Guinea Current LME face strong coastal area degradation and living resources depletion. Though possessing different socio-economic conditions and being on differing development paths, the threats to their common environment provide the glue that sustains a strong dialogue amongst these states. Based on the Preliminary TDA process, the major perceived problems and issues the countries face were determined to be:

5. Decline in GCLME fish stocks and unsustainable harvesting of living resources;
6. Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including effects of global climate change;
7. Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms;
8. Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion.

The identified Root Causes of the four transboundary environmental problems include:

- Complexity of ecosystem and high degree of variability (resources and environment;
- Inadequate capacity development (human and infrastructure) and training
- Poor or ineffective legal framework at the regional and national levels; inadequate implementation of national regulatory instruments; lack of regional harmonization of regulations,
- Inadequate implementation of available regulatory instruments
- Inadequate planning at all levels
- Insufficient public involvement
- Inadequate financial mechanisms and support
- Poverty
- Insufficient financing mechanisms and support
- Lack of political will

A2. The overall development goal of this project is to create a regional management framework for sustainable use of living and non-living resources in the GCLME. Priority action areas include reversing coastal area degradation and living resources depletion, relying heavily on regional capacity building. Sustainability will derive from this improved capacity, strengthening of national and regional institutions and improvements in policy/legislative frameworks.

Baseline

A3. The GCLME is an important global resource. The GCLME, ranked among the most productive coastal and offshore waters in the world, includes vast fishery resources, oil and gas reserves, precious minerals, a high potential for tourism and serves as an important reservoir of marine biological diversity of global significance. The Guinea Current therefore represents a distinct economic and food fish security source with the continuum of coastal and offshore waters together with the associated near shore watersheds. These habitats and the living resources are threatened by anthropogenic activities including

overexploitation of fisheries resources, pollution from land-based sources of pollution and degradation of coastal areas including through erosion. Each country has its own legal/regulatory structure to address these issues, but none has a National Programme of Action and there is no Protocol for the Abidjan Convention. Global benefits can be optimized by incremental improvements to the national approaches.

A4. The GCLME countries are signatories to many, but not all, international environmental conventions and agreements. The countries are often weak in complying with the conventions that they do participate in, however; the present activities would assist the countries in meeting compliance with several international conventions.

A5. Regional monitoring and collaboration in the area of transboundary issues is weak-to-non-existent. Missing are mechanisms to provide regional collaboration on transboundary issues in the form of a regional coordination unit, regionally agreed environmental quality standards, regionally agreed environmental monitoring protocols and methods, and the like. Effective and quantitative regional assessments of these transboundary issues have not been possible because of this lack of coordination.

A6. In spite of the lack of a sub-regional environmental framework among the GCLME countries, the countries participate in numerous bodies that work together on various aspects of coastal degradation and protection of living marine resources (e.g., Abidjan Convention and the WACAF Action Plan), though none has specific authority on the areas addressed in this project. This national willingness to participate in sub-regional affairs provides a strong foundation for further successful regional cooperative efforts.

A7. A substantial proportion of the assured co-financing by governments is derived from the existing staff and recurrent budgets of the involved ministries and government departments. It is anticipated that project activities will strengthen the influence of these ministries at a national level and hence encourage substantial increases in the recurrent budgets of the departments concerned in the future. The countries already contribute financially to regionally coordinated actions and such contributions are anticipated to increase as a consequence of this project.

Global Environmental Objectives

A9. This project is a result of the participating countries' commitment to address land-based and sea-based threats to prevent further damage to the GCLME's transboundary environmental resources. The global environmental objective being pursued is to improve sectoral policies and activities that are responsible for the most serious root causes of priority transboundary environmental concerns of the GCLME.

A10. The establishment of a GCLME-wide cooperative regime for land and sea-based activities will contribute to environmentally sustainable economic development in and around the region. An ad hoc system of national level measures to manage land and sea-based sources will be unsuccessful when applied to a contiguous natural system such as the GCLME unless a regional coordination mechanism exists. This project will strengthen that mechanism and develop measures to assure long-term sustainability of that mechanism.

A11. The rich biodiversity of mammals, corals, turtles, birds, and other marine species in the GCLME represents a major contribution to the overall global biodiversity. In order to avoid further losses of biodiversity in the GCLME, the health of this degraded ecosystem must be improved, and a Strategic Action Programme must be agreed upon and implemented.

A12. By providing a framework for the reduction and mitigation of coastal degradation and the sustainable use of living and non-living marine resources, the project will contribute to an improved global environment.

A13. This project will create the necessary conditions and framework for concerted actions to protect globally important environmental resources. The present project is consistent with the GEF Operational Strategy of April 1996, specifically with the GEF's strategic emphasis on International Waters and Biodiversity, as well as the GEF Operational Programme No. 9 "Integrated Land and Water Multiple Focal Area". The project will incorporate the priorities delineated in the relevant environmental agreements to which any or all of the participating countries are involved. The present project also is consistent with the recent Draft GEF International Waters Focal Area- Strategic Priorities in Support of WSSD Outcomes for FY 2003-2006, as discussed under "GEF Programming Context."

GEF Project Activities

A14. Under the alternative GEF scenario, the development processes and forces are re-shaped in order to safeguard the globally important environment. This would be accomplished by GEF provision of catalytic support for incremental costs associated with the revision and upgrading of the Transboundary Diagnostic Analysis (TDA) and preparation and endorsement of a Strategic Action Programme (SAP) for the GCLME. The SAP will consist of a set of legal, policy and institutional reforms and investments, together with capacity building and institutional strengthening, to address the priority transboundary concerns of land and sea-based sources of pollution, depletion of marine resources and degradation of coastal areas as identified in the preliminary TDA (optional Annex E).

A15. In particular, the project will provide technical assistance to strengthen both national and regional capacities for the implementation of the SAP. The SAP will rely on the cost-effectiveness of joint efforts made by the participating countries. In addition, cooperative programmes in data sharing and legislative reforms will be conducted to enhance regional collaboration to implement the SAP.

A16. The incremental cost of the alternative activities of this project will ensure that plans and investments will be designed with global (transboundary) environmental considerations in mind.

A17. The GEF alternative would support a regionally led initiative to promote the management and conservation of the coastal and marine resources of the GCLME. It would greatly facilitate the abilities of co-operating countries to address transboundary environmental issues and common natural resources management concerns at the regional level. The GEF alternative would allow for the realization of a dynamic action-oriented work programme for the successful implementation of the SAP, to be undertaken on an accelerated basis with support from a variety of sources. These goals would be realized through support for the following specific immediate project components:

1) Finalize SAP and develop sustainable financing mechanism for its implementation
2) Recovery and sustainability of depleted fisheries and living marine resources including mariculture
3) Planning for biodiversity conservation, restoration of degraded habitats and developing strategies for reducing coastal erosion
4) Reduce land and sea-based pollution and improve water quality
5) Regional Coordination and Institutional Sustainability

A18. This project has leveraged approximately **US**$32.136 million (29,861,442 from countries, plus 2,075,000 from Norway, UNEP and UNDP) to finance the activities of GEF/SAP focal points, provide logistical support and personnel, set-up institutional arrangements, provide sourcing of information, and

support consultations, meetings and missions. The participating states, agencies, private sector and other donors have provided estimates of their co-financing commitments (see Annex O) to the project as follows:

Angola	US$	**1,096,000**
Benin	US$	**550,000**
Cameroon	US$	**1,965,500**
Congo	US$	**211,850**
Cote d'Ivoire	US$	**964,500**
Dem. Rep. of Congo	US$	**184,500**
Equatorial Guinea	US$	**495,000**
Gabon	US$	**362,000**
Ghana	US$	**5,860,000**
Guinea	US$	**2,626,000**
Guinea Bissau	US$	**2,205,500**
Liberia	US$	**164,092**
Nigeria	US$	**11,210,000**
Sao Tome & Principe	US$	**496,000**
Sierra Leone	US$	**1,443,000**
Togo	US$	**522,500**
NOAA	US$	600,000
UNEP/UNDP	US$	230,000
Norway	US$	2,084,850
Alpha Filtration	US$	600,000
TOTAL	**US$**	**33,871,292**

System Boundary

The area of intervention is defined as follows:

A20. The countries of the GCLME: Belize Angola, Benin, Cameroon, Congo, Democratic Republic of the Congo, Côte d'Ivoire, Gabon, Ghana, Equatorial Guinea, Guinea, Guinea-Bissau, Liberia, Nigeria, Sao Tome and Principe, Sierra Lone and Togo

A21. The boundaries of the Guinea Current study area can be defined geographically and oceanographically. Geographically, the GCLME extends from approximately 12 degrees N latitude south to about 16 degrees S latitude, and variously from 20 degrees west to about 12 degrees East longitude. From an oceanographic sense, the GCLME extends in a north-south direction from the intense upwelling area of the Guinea Current south to the northern seasonal limit of the Benguela Oceanographic Current (Figure 1). In an east-west sense, the GCLME includes the drainage basins of the major rivers seaward to the GC front delimiting the GC from open ocean waters (a time- and space-variable boundary).

ANNEX A
INCREMENTAL COST MATRIX

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
I) Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia) Fill gaps in regional monitoring methods/ standards/etc. by training and at-sea demonstrations for contaminant levels in water, sediments and biota	Baseline	1,858,000	Each country at present has its own approach to monitoring and standards are not uniform throughout the region. There are many gaps in monitoring water, sediments and biota.	Regional benefits cannot be accrued from existing piecemeal monitoring programs, which vary from country to country.
		Alternative	2,458,240	Filling the gaps in regional monitoring methods/ standards will allow effective monitoring and ease cross-border exchange of data and information.	Regional assessments of water and sediment quality and biota will be possible only with a complete and standardized approach to monitoring and standards.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 349,000 251,240		
	Ib) Identify and fill gaps for the TDA, including biodiversity (using NBSAPs where available), socio-economic conditions, legal/regulatory review, stakeholder analysis, hot spots, contaminant levels, etc.	Baseline	1,349,500	The countries continue to collect data that will benefit the updated TDA.	There is no integration across countries, so global benefits are not recognized..
		Alternative	2,288,230	The TDA process is a useful framework for understanding the relative effects and impacts of human activities on the environment, and helps focus interventions to the most critical pathways. Domestic benefits	The TDA will provide an understanding and ranking of the transboundary (global) environmental problems, and recommend interventions to optimize the global environmental benefits. This process is highly participatory, and allows funds and interventions to focus on priority transboundary areas.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				will ensue by focusing interventions in those critical areas.	
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 247,500 691,230		
	Ic) Update TDA following filling of gaps	Baseline	730,000	The countries continue to collect data that will benefit the updated TDA.	There is no integration across countries, so global benefits are not recognized..
		Alternative	1,190,054	The TDA process is a useful framework for understanding the relative effects and impacts of human activities on the environment, and helps focus interventions to the most critical pathways. Domestic benefits will ensue by focusing interventions in those critical areas.	The TDA will provide an understanding and ranking of the transboundary (global) environmental problems, and recommend interventions to optimize the global environmental benefits. This process is highly participatory, and allows funds and interventions to focus on priority transboundary areas.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 111,500 348,554		
	Id) Prepare and endorse National Action Plans	Baseline	975,500	The absence of funding has hampered the ability of GCLME countries to consider National Action Plans.	The absence of funding has hampered the ability of GCLME countries to consider National Action Plans.
		Alternative	1,781,304	A National Action Plan will serve as a blueprint for the country to improve both its local marine/coastal environment and the broader	National Action Plans will serve to operationalize national level activities towards addressing priority transboundary water resource issues.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				GCLME..	
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	195,500 610,304		
	Ie) Finalize and endorse regional Strategic Action Programme	Baseline	757,500	A regional SAP will not be completed and endorsed under baseline conditions.	A regional SAP will not be completed and endorsed under baseline conditions.
		Alternative	1,164,158	A Strategic Action Programme represents a regionally agreed programme of action for improving the environment and reducing man-made stresses on the environment. The process of broad stakeholder inclusion will strengthen sustainability, and focus efforts on priority areas.	The SAP is an integral part of the GEF process, building on the TDA outcome to focus interventions to those issues having a dominant Transboundary nature. The SAP process fosters regional consensus-building, and commitments of all countries and external partners to improve the environment in a prioritized, coordinated fashion.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	116,500 290,158		
	If) Hold a donors' conference to mobilize commitments to SAP implementation	Baseline	313,000	Limited national finance for SAP implementation, targeting primarily domestic issues.	Insufficient finance for SAP implementation
		Alternative	499,379	Funding of SAP activities will be secured, leveraging national contributions to SAP implementation and improving the GCLME environment.	Donor commitments to funding SAP implementation will benefit the regional and global environment because priority protection efforts will be undertaken.
		Increment GOV Co-finance GEF Co-Finance	93,500 92,879		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		Private Sector Co-Finance Others Co-Finance			
	Ig) Formulate arrangements for sustainable financing of environmental management of the GCLME	Baseline	1,092,500	National budgets are stressed and adequate budget is not provided for environmental matters. Minimal application of economic instruments in addressing priority water-related issues in the GCLME	There currently is no GCLME-wide regional financing mechanism for regional land-based and sea-based pollution prevention, control and monitoring. No application of economic instruments to address transboundary environmental issues in GCLME
		Alternative	1,595,131	New and innovative financing arrangementspermit countries to finance national commitments to the NAPs/SAP; Economic instruments will help alleviate national budget shortfalls in the area of environmental intervention. Alternative economic instruments can provide fresh revenue sources to encourage sustainability	Global benefits will ensue from provision of sustainable financing relatively secure from the vicissitudes of fluctuations in national budgets. Sustainability will help assure long-term improvements to global environmental resources. Sustainability is the key to maximizing global environmental benefits. By exploring new economic instruments and incentives, a solid financing package may result.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	295,000 207,631		
I) Finalize SAP and develop sustainable financing mechanisms for its implementation	Total Angola	GOV Co-finance	3,500		
	Total Benin	GOV Co-finance	0		
	Total Cameroon	GOV Co-finance	288,500		
	Total Congo	GOV Co-finance	197,500		
	Total Democratic Republic of the Congo	GOV Co-finance	52,000		
	Total Cote d'Ivoire	GOV Co-finance	126,000		
	Total Gabon	GOV Co-finance	161,000		
	Total Ghana	GOV Co-finance	0		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
	Total Equatorial Guinea	GOV Co-finance	0		
	Total Guinea	GOV Co-finance	0		
	Total Guinea-Bissau	GOV Co-finance	350,500		
	Total Liberia	GOV Co-finance	0		
	Total Nigeria	GOV Co-finance	0		
	Total Sao Tome and Principe	GOV Co-finance	0		
	Total Sierra Leone	GOV Co-finance	166,500		
	Total Togo	GOV Co-finance	63,000		
	Total Objective	**GOV Co-finance**	**1,408,500**		
II) Recovery and sustainability of depleted fisheries and living marine resources, including Mariculture	IIa) Demonstrate regional stock assessment methods including regional surveys (Regional Demonstration Project)	Baseline	5,048,066	Current knowledge of regional stocks is incomplete. Stock assessment information is lacking, limited or outdated in most countries. Only irregular trawl and acoustic surveys exist in national waters.	Current knowledge of regional stocks is incomplete. There is a lack of reliable statistics on the regional stocks of major commercial fishes.
		Alternative	9,014,022	Improving national capabilities for assessing fish stocks will enable national governments to set more appropriate fishing limits and thereby improve fish stocks.	Improved regional capacity for assessing and monitoring fish stocks will assist in preserving priority transboundary species and promoting sustainable fisheries in the GCLME.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance NOAA	 2,631,532 1,034,424 300,000		
	IIb) Identify and utilize optimal methods and estimates for maximum sustainable yields for dominant commercially important fisheries species	Baseline	2,034,000	Few activities have been done at the national level to estimate maximum sustainable yields.	No tools for estimating maximum sustainable yields of shared fish stocks available/in use.
		Alternative	2,785,737	Estimating maximum sustainable yields for dominant	Determining sustainable yields will improve regional efforts to protect transboundary fish stocks and promote

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				commercially important species will improve national capacity to establish and monitor fishing limits, thereby creating sustainable fisheries.	sustainable fisheries in the GCLME.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance NOAA	 332,000 119,737 $300,000		
	IIc) Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project)	Baseline	1,928,635	Few national activities of this sort take place under baseline conditions. There are only limited capabilities for assessing the carrying capacity of the GCLME.	Few national activities of this sort take place under baseline conditions. Knowledge of productivity with regards to its carrying capacity is incomplete. There are only limited capabilities for assessing the carrying capacity of the GCLME.
		Alternative	3,903,835	Improved knowledge of productivity will assist national governments to set limits for and monitor the sustainable use of living marine resources of the ecosystem.	Improved knowledge of productivity with regards to its carrying capacity will assist in the regional protection and sustainable use of transboundary living marine resources of the ecosystem.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 334,200 1,641,000		
	IId) Develop Regional Agreements and Regional Fisheries Commission	Baseline	262,500	Few bilateral and multilateral fisheries agreements exist and there currently is no regional fisheries commission. Majority of fisheries management being done at national level without regional coordination.	Bilateral and multilateral fisheries agreements are not complete. No regional fisheries agreements are in place. There region lacks a fisheries management mechanism.
		Alternative	675,081	Developing regional	Regional agreements and a regional management

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				agreements and a regional commission will assist in the improved capacity for monitoring and enforcement of fisheries yields, thereby enhancing sustainable domestic use of fish resources.	mechanism will improve regional capacity for establishing, monitoring and enforcing sustainable yields of transboundary stocks.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	56,500 356,081		
	IIe) Assess and draft modifications to the National Legal Frameworks to achieve sustainable fisheries	Baseline	1,033,200	National fisheries legislation exists in all GCLME countries, but is inconsistent, sometimes incomplete and enforcement is lacking.	National fisheries legislation exists in all GCLME countries, but is inconsistent, sometimes incomplete and enforcement is lacking.
		Alternative	1,556,575	An assessment of the national legal/ regulatory regime will assist the country in focusing improvements to the regime in those areas where the gaps are the widest. An improved national legal basis for fisheries management will improve capacity for monitoring and enforcing the development of sustainable fisheries.	Regional benefits will accrue from knowing comparability and extent of harmonization of laws so interventions can focus on improving those weaknesses to assure global benefits. Improved and consistent national fisheries legislation based upon enhanced fish stock assessments will increase regional capacity for sustainable management of regional stocks.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	223,000 300,375		
	IIf) Develop Fisheries Management Plans for at	Baseline	1,175,000	Only limited application of fisheries management planning	No coordinated fisheries management planning for shared fish stocks.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
	least three fisheries			to few domestic stocks	
		Alternative	2,729,700	Demonstrations of fisheries management plans for at least three fisheries will improve national capacities for the management of sustainable fisheries.	The development of fisheries management plans will improve management of regional and transboundary fish stocks.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 1,397,000 157,700		
	IIg) Assess existing coastal aquaculture and Mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP	Baseline	2,117,150	Poorly planned and unsustainable mariculture exists in the countries. Existing mariculture regulations contain insufficient environmental safeguards.	There is not regional approach to mariculture and no regional regulations or agreements on mariculture development. There is a lack of data on the transboundary effects of mariculture in the GCLME.
		Alternative	2,486,002	Environmentally sustainable coastal aquaculture and mariculture will provide improved national food security and alternative forms of employment for coastal populations.	Environmentally sustainable coastal aquaculture and mariculture will reduce pressure on transboundary fish stocks by improving regional food security and providing an alternative source of revenue.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Norway co-finance Others Co-Finance	 261,300 62,352 $45,200		
II) Recovery and	Total Angola	GOV Co-finance	375,000		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
sustainability of depleted fisheries and living marine resources, including Mariculture	Total Benin	GOV Co-finance	85,000		
	Total Cameroon	GOV Co-finance	280,000		
	Total Congo	GOV Co-finance	14,350		
	Total Democratic Republic of the Congo	GOV Co-finance	82,000		
	Total Cote d'Ivoire	GOV Co-finance	227,000		
	Total Gabon	GOV Co-finance	47,000		
	Total Ghana	GOV Co-finance	0		
	Total Equatorial Guinea	GOV Co-finance	0		
	Total Guinea	GOV Co-finance	2,050,000		
	Total Guinea-Bissau	GOV Co-finance	508,000		
	Total Liberia	GOV Co-finance	30,182		
	Total Nigeria	GOV Co-finance	100,000		
	Total Sao Tome and Principe	GOV Co-finance	200,000		
	Total Sierra Leone	GOV Co-finance	1,167,000		
	Total Togo	GOV Co-finance	70,000		
	Total Objective	**GOV Co-finance**	**5,235,532**		
	Norway	**Co-Finance**	**$45,200**		
	NOAA	**Co-Finance**	**600,000**		
III) Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa) Develop Regional Biodiversity Action Plan, including Protected Areas building on existing Biodiversity Action Plans (National Demonstration Project)	Baseline	8,680,500	Basic regulations for biodiversity protection exist at the national level, but are inconsistent and lack enforcement.	There currently is no regional agreement or management framework for biodiversity protection in the GCLME.
		Alternative	10,408,891	A Regional Biodiversity Action Plan will serve as a blueprint for the national governments to preserve priority regional biodiversity and habitats in the GCLME.	A regional plan will signal strong regional commitment to biodiversity protection and will help to ensure that priority global and transboundary species and their habitats are protected.
		Increment GOV Co-finance	662,500		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		GEF Co-Finance Private Sector Co-Finance Others Co-Finance	1,065,891		
	IIIb) Demonstrate restoration of priority mangrove areas (National Demonstration Project)	Baseline	15,877,800	Few activities of this sort take place at the national level under baseline conditions. Only Nigeria has a significant program.	Limited restoration activities and only at national level, with little regard for broader threats to and needs of ecosystem.
		Alternative	18,004,800	Each country will benefit from knowledge gained from demonstration projects in the region as the information will be widely shared and can assist countries in making investment decisions on habitat restoration activities.	The Regional Biodiversity Action Plan will benefit from having demonstrated methods of habitat restoration. Important breeding and nursing grounds for transboundary fish stocks will have been restored
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	1,237,000 890,000		
	IIIc) Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH) for habitat protection (National Demonstration Project)	Baseline	18,847,000	ICARM principles and PADH not currently being applied in countries in the region.	ICARM principles and PADH not currently being applied in the region.
		Alternative	22,581,200	Each country will benefit from knowledge gained from the demonstration project in the region and experiences shared	The LBA protocol to the Abidjan Convention will benefit from having demonstrated methods of integrated management of river basins and coastal zones.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				with other freshwater-coastal cases in sub-Saharan Africa as the information will be widely available and shared. This can assist countries in making policy decisions on the integrated management of river basin and coastal zone under the National Action Plans.	
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Norway co-finance Others Co-Finance	 2,865,000 824,000 $45,200		
	IIId) Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control	Baseline	55,531,500	Status of introduced species and their threats to national coastal resources is poorly understood. The national legal/regulatory mechanisms for their control are weak.	Status of introduced species and their threats to broader GCLME is poorly understood. Regional legal/regulatory mechanisms for their control non-existent.
		Alternative	56,673,958	An assessment of the status and threats posed by introduced species will enable countries to make policy and investment decisions regarding the management and mitigation of introduced species to their national waters. An enhanced legal/regulatory mechanism will help to control the spread of introduced species.	An assessment will help to clarify the transboundary threats posed by introduced species. A regional legal/regulatory control mechanism will help to mitigate these threats.
		Increment GOV Co-finance	 852,000		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		GEF Co-Finance Private Sector Co-Finance Others Co-Finance	290,458		
	IIIe) Perform gap analysis of national legislation and draft improvements to legislation regarding key elements of biodiversity identified in the TDA, introduced species, and habitats, etc.	Baseline	716,500	In sufficient understanding of key gaps in national legislation and reforms needed.	No Transboundary, regional view of pertinent legislation has taken place.
		Alternative	1,061,054	An independent review of the national legal/ regulatory regime will assist the countries in focusing improvements to the regime in those areas where the gaps are the widest. Policy, legal, and regulatory reform will benefit domestic environmental objectives.	Regional benefits will accrue from knowing comparability and extent of harmonization of laws and drafting of reforms that focus on improving the identified weaknesses to assure global benefits.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	96,000 248,554		
	IIIf) Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National	Baseline	452,612,937	Countries investing sizeable sums in erosion control and habitat protection but with insufficient integration of biodiversity elements.	National erosion control and habitat protection activities don't take into account transboundary issues such as cross-border sediment flows,effects of river modification on downstream sediment budgets, and spawning/nursing grounds for transboundary fish stocks.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
	Demonstration Project)				
		Alternative	457,829,916	Each country will benefit from knowledge gained from demonstration projects in the region, as the information will be widely available and widely shared, and can assist in countries making investment decisions for protecting coastlines and coastal habitats.	The SAP will benefit from having standardized and demonstrated methods for protecting coastlines and coastal habitats. Increased availability of spawning and nursery habitat for migratory fish species.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 4,282,400 934,579		
III) Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	Total Angola	GOV Co-finance	240,000		
	Total Benin	GOV Co-finance	70,000		
	Total Cameroon	GOV Co-finance	1,132,000		
	Total Congo	GOV Co-finance	0		
	Total Democratic Republic of the Congo	GOV Co-finance	30,000		
	Total Cote d'Ivoire	GOV Co-finance	352,000		
	Total Gabon	GOV Co-finance	59,000		
	Total Ghana	GOV Co-finance	0		
	Total Equatorial Guinea	GOV Co-finance	0		
	Total Guinea	GOV Co-finance	90,000		
	Total Guinea-Bissau	GOV Co-finance	359,000		
	Total Liberia	GOV Co-finance	24,400		
	Total Nigeria	GOV Co-finance	7,510,000		
	Total Sao Tome and Principe	GOV Co-finance	40,000		
	Total Sierra Leone	GOV Co-finance	54,000		
	Total Togo	GOV Co-finance	34,500		
	Total Objective	**GOV Co-finance**	**9,994,900**		
	Norway	**Co-finance**	**$45,200**		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
IV) Reduce land and sea-based pollution and improve water quality	IVa) Facilitate development of regionally-integrated and consistent National Programmes of Action for Land-Based Activities, including updating inventories of pollution and habitat hot spots	Baseline	153,884,750	Limited planning and implementation of GPA-LBA by participating countries; continued pollution and degradation of coastal waters.	Transboundary pollutant emissions by GCLME countries continue to increase in parallel with national development.
		Alternative	158,248,022	A National Programme of Action will serve as a blueprint for the country to improve its marine and coastal environment by controlling land-based sources. Countries can benefit from pollution hot spot and habitat analysis by prioritizing budget expenditures on the basis of real knowledge.	National Programmes of Action signal individual country commitments to controlling land-based activities contributing to transboundary water degradation.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 3,831,285 531,987		
	IVb) Develop and implement a Regional Programme of Action for Land-Based Activities	Baseline	974,447	Countries currently address land-based activities in a piece-meal fashion, lacking a National GPA-LBA Plan of Action.	National efforts do not take into consideration the Transboundary impacts of land-based activities originating from their country.
		Alternative	1,779,047	Regional Programme of Action ensures coordination and harmonization of National GPA-LBA Action Plans	A Regional Programme of Action will globalize the benefits of National Programmes of Action by setting common standards, common activities of concern, common levels of commitment and common activities among all countries.
		Increment GOV Co-finance GEF Co-Finance	 $256,550 0		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		Private Sector Co-Finance Norway co-finance Others Co-Finance	 $548,050		
	IVc) Develop a protocol on LBA for the Abidjan Convention	Baseline	$795,280	Country commitments under Abidjan Convention continue not to include commitments to GPA-LBA.	No legal commitment of GCLME countries to protection of GCLME through GPA-LBA implementation.
		Alternative	1,702,170	Countries legally obligated under Abidjan Convention to implement GPA-LBA.	A protocol on LBA for the Abidjan Convention will globalize the benefits of National Programmes of Action by setting common standards, common activities of concern, common levels of commitment and common activities among all countries.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Norway co-finance Others Co-Finance	 $228,890 0 $678,000		
	IVd) Regional assessment of marine maritime pollution prevention measures, contingency planning, and spill response capabilities	Baseline	$62,952,130	Limited country capacity to prevent, plan for and respond to maritime pollution.	Continued threat of transboundary maritime pollution events.
		Alternative	70,309,907	By conducting a regional assessment, each country will develop a more accurate idea of maritime pollution risks to its coastal environment as part of the prioritization process for SAP interventions	Improved understanding of regional threats from maritime pollution and needed reforms and capacity building.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-	 6,967,470 390,307		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		Finance Others Co-Finance			
	IVe) Development of regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation)	Baseline	455,500	National networks for emergency response exist in some countries, but funding is lacking and implementation is poor. No regional cooperation mechanism exists.	Under baseline conditions, the region does not have adequate capacity to address major transboundary marine pollution incidents.
		Alternative	750,000	The development of regional systems for cooperation will minimize duplication of efforts at the national level and enable countries to better control and cleanup spills that impact their marine/coastal natural resources. .	The GCLME countries will be better able to protect globally significant biodiversity and habitats from major marine pollution incidents.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 114,500 180,000		
	IVf) Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL, OPRC) as related to oil and gas activities	Baseline	193,510	Limited national implementation of key maritime environmental conventions.	Continued threats of transboundary maritime pollution incidents due to lack of or weak implementation of key maritime conventions.
		Alternative	373,471	Legal, and regulatory reform will benefit domestic environmental objectives. Reduced risk to national marine and coastal resources from	Reduced risk of transboundary maritime pollution events due to adoption and improved implemenetation of key maritime conventions.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				maritime pollution	
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	44,280 135,681		
	IVg) Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (National Demonstration Project)	Baseline	979,495	Continued problems with coastal eutrophication in many GCLME countries. Existing national capacities for effective marine contaminant reduction and mitigation are usually weak and poorly focused.	Ongoing threat of transboundary nutrient pollution/eutrophication. Continued degradation of globally significant lagoon habitat.
		Alternative	2,541,530	Each country will benefit from knowledge gained from demonstration projects in the region as the information will be widely available and shared, and can assist in countries making investment decisions for reducing nutrient influx to the marine environment. Environmental conditions improved in at least one demonstration area.	The Regional Programme of Action will benefit from having demonstrated methods to reduce nutrient influx to the marine environment. Adoption and replication of effective nutrient control strategies will reduce the longer-term risk of broader GCLME-wide eutrophication.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	226,135 1,335,900 600,000		
	IVh) Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA	Baseline	538,000	Limited national focus on resource mobilization for SAP/NAP implementation.	Insufficient finance to implement SAP actions addressing priority transboundary issues.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		Alternative	852,306	Finance mobilized to implement SAP/NAPs protects and restores selected national coastal and marine resources.	Global benefits will ensue from the development of investment opportunities for reducing ecosystem threats identified in the TDA. Sustainability will help assure long-term improvements to global environmental resources.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 177,000 137,306		
IV) Reduce land and sea-based pollution and improve water quality	Total Angola	GOV Co-finance	477,500		
	Total Benin	GOV Co-finance	315,000		
	Total Cameroon	GOV Co-finance	208,000		
	Total Congo	GOV Co-finance	0		
	Total Democratic Republic of the Congo	GOV Co-finance	7,000		
	Total Cote d'Ivoire	GOV Co-finance	207,000		
	Total Gabon	GOV Co-finance	60,500		
	Total Ghana	GOV Co-finance	5,800,000		
	Total Equatorial Guinea	GOV Co-finance	0		
	Total Guinea	GOV Co-finance	411,000		
	Total Guinea-Bissau	GOV Co-finance	473,000		
	Total Liberia	GOV Co-finance	105,610		
	Total Nigeria	GOV Co-finance	3,500,000		
	Total Sao Tome and Principe	GOV Co-finance	156,000		
	Total Sierra Leone	GOV Co-finance	25,500		
	Total Togo	GOV Co-finance	100,000		
	Total Objective	**GOV Co-finance**	**11,846,110**		
	Norway	**Co-finance**	**1,226,050**		
	Private Sector	**Co-finance**	**600,000**		
V) Regional coordination and institutional sustainability	Va) Develop a regional project coordination mechanism	Baseline	2,725,200	Countries in the region have some form of institutional framework for coastal and marine resources protection, but no effective regional project	No effective regional project coordination mechanism now exists; this effort will provide an exchange and cooperation mechanisms to address transboundary problems.

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				coordination mechanism currently exists.	
		Alternative	7,935,074	Existing national mechanisms will be strengthened by regional cooperation and focus. A GEF project unit will bring additional resources and capacity to the region.	A GEF project unit will catalyze and coordinate the GCLME countries towards reduction of land-based and marine sources of pollution, biodiversity and habitat loss, and sustainable use of marine living resources.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Norway co-finance Others Co-Finance	 633,900 3,807,574 $768,400		
	Vb) Develop effective Steering Committee	Baseline	361,500	Most interactions are bilateral, not GCLME-wide..	No regional mechanism in place for government, donor and other stakeholder coordination, consultation, strategic planning and M&E in promoting multi-country integrated sustainable management of the GCLME.
		Alternative	659,092	An effective Steering Committee will ensure better utilization of scarce GEF resources.	Effective mechanisms exist to ensure broad stakeholder involvement in the development and implementation of SAP/NAPs for the GCLME..
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 79,000 218,592		
	Vc) Establish Intersectoral/ Interministerial/ Ministerial Coordination	Baseline	313,500	Limited interministerial coordination exists in the country, but needs to be improved upon for project execution and SAP implementation.	Limited interministerial coordination exists in the country, but needs to be improved upon for project execution and SAP implementation.
		Alternative	612,000	Intersectoral/ Interministerial/ Ministerial Coordination will	Ensures that a coordinated multi-sectoral approach is taken in addressing the priority transboundary environmental

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				help to ensure effective multi-sectoral approach to developing and implementing SAP/NAPs at national level.	problems of the GCLME.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 98,500 200,000		
	Vd) Idendify, strengthen and involve stakeholders	Baseline	796,000	Existing stakeholders at national level are not well identified or organized for addressing priority GCLME issues.	Lack of uniformity of stakeholder participation in environmental decision-making generates disparate public buy-in for environmental actions. Little evidence for multi-country stakeholder bodies/mechanism nor those that focus on transboundary issues.
		Alternative	1,774,505	Regional stakeholder strengthening will increase national impact of stakeholder inputs to national environmental issues.	Identification and involvement of appropriate stakeholders in TDA/SAP/NAP processes in transboundary context
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 135,000 843,505		
	Ve) Develop Environmental Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project)	Baseline	893,000	Countries in the region have national environmental data centres, but there is no regional information system and only limited sharing of data.	Countries in the region have national environmental data centres, but there is no regional information system and only limited sharing of data.
		Alternative	2,082,600	The creation of a regional environmental information system will provide domestic	The data and information management system will provide transboundary (global) benefits through developing technical capacity to collect regional environmental information and

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
				benefits through development of technical capacity and protocols for the collection and sharing of environmental data.	assist in the .prioritization of threats and the interventions to mitigate these threats.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance Others Co-Finance	 194,000 995,600		
	Vf) Monitoring and Evaluation (M&E)	Baseline	430,000	Not a part of the baseline program.	Not a part of the baseline program.
		Alternative	1,048,580	Effective and timely project monitoring and evaluation will ensure better utilization of scarce GEF resources.	More effective use of GEF resources will help maximize global environmental benefits by minimizing overlap and fostering adaptive project management.
		Increment GOV Co-finance GEF Co-Finance UDNP Co-Finance UNEP Co-Finance	 90,000 298,580 100,000 130,000		
	Vg) Develop regional coordination mechanism (an Interim Guinea Current Commission, followed by a full-time Commission)	Baseline	150,000	Coordination principally occurs only at the national level.	No regional coordination mechanism currently exists so very limited opportunity to address transboundary and biodiversity issues using an ecosystem approach..
		Alternative	416,258	A regional coordination mechanism will help countries to harmonize policies and legislation and to share experiences and best practices in protecting their coastal and marine resources.	A GCC will serve to institutionalize and sustain monitoring and implementation of the SAP/NAPs and other commitments made under the project to ecosyste-based management of the GCLME. Establishing linkages with the Abidjan Convention and other LME projects, resources will be used more effectively, helping to maximize global environmental benefits by minimizing overlap.
		Increment GOV Co-finance GEF Co-Finance	 29,500 236,758		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
		Private Sector Co-Finance Others Co-Finance			
	Vh) Provide capacity building for the IGCC	Baseline	603,000	Not a part of the baseline program.	Not a part of the baseline program.
		Alternative	811,900	Improved capacity for the regional coordination mechanism will help to ensure that its actions are effective and provide the most national and regional benefits.	Improved capacity for the regional coordination mechanism will help to ensure that its actions are effective and provide the most regional benefits.
		Increment GOV Co-finance GEF Co-Finance Private Sector Co-Finance UNDP Co-Finance UNEP Co-Finance	 116,500 92,400 0 0		
V) Regional coordination and institutional sustainability	Total Angola	GOV Co-finance	0		
	Total Benin	GOV Co-finance	80,000		
	Total Cameroon	GOV Co-finance	57,000		
	Total Congo	GOV Co-finance	0		
	Total Democratic Republic of the Congo	GOV Co-finance	13,500		
	Total Cote d'Ivoire	GOV Co-finance	52,500		
	Total Gabon	GOV Co-finance	34,500		
	Total Ghana	GOV Co-finance	60,000		
	Total Equatorial Guinea	GOV Co-finance	0		
	Total Guinea	GOV Co-finance	75,000		
	Total Guinea-Bissau	GOV Co-finance	515,000		
	Total Liberia	GOV Co-finance	3,900		
	Total Nigeria	GOV Co-finance	100,000		
	Total Sao Tome and Principe	GOV Co-finance	100,000		
	Total Sierra Leone	GOV Co-finance	30,000		
	Total Togo	GOV Co-finance	255,000		
	Total Objective	**GOV Co-finance**	**1,376,400**		

Component	Sub-Component	Cost Category	Cost (USD$)	Domestic Benefits	Global Environmental Benefits
	Norway	**Co-finance**	**768,400**		
	UNDP	**Co-finance**	**100,000**		
	UNEP	**Co-finance**	**130,000**		

ANNEX A SUMMARY INCREMENTAL COST MATRIX

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
I) Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia) Fill gaps in regional monitoring methods/ standards/etc. By training and at-sea demonstrations for contaminant levels in water, sediments, and biota	1,858,000	2,458,240	349,000		251,240
	Ib) Identify and fill gaps for the TDA, including biodiversity, socio-economic conditions, legal/regulatory review, stakeholder analysis, hot spots, contaminant levels, etc.	1,349,500	2,288,230	247,500		691,230
	Ic) Update TDA following filling of gaps	730,000	1,190,054	111,500		348,554
	Id) Prepare and endorse National Action Plans	975,500	1,781,304	195,500		610,304
	Ie) Finalize and endorse regional Strategic Action Programme	757,500	1,164,158	116,500		290,158
	If) Hold a donors' conference to mobilize commitments to SAP implementation	313,000	499,379	93,500		92,879
	Ig) Formulate arrangements for sustainable financing of environmental management of the GCLME	1,092,500	1,595,131	295,000		207,631
	Angola	12,500		3,500		
	Benin	0		0		
	Cameroon	1,150,000		288,500		
	Congo	2,170,000		197,500		
	Democratic Republic of the Congo	496,000		52,000		
	Cote d'Ivoire	621,000		126,000		
	Gabon	690,000		161,000		
	Ghana	0		0		
	Equatorial Guinea	0		0		
	Guinea	0		0		
	Guinea-Bissau	1,558,000		350,500		
	Liberia	0		0		
	Nigeria	0		0		
	Sao Tome and Principe	0		0		

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
	Sierra Leone	211,500		166,500		
	Togo	167,000		63,000		
	Total Objective	**7,076,000**	**10,976,496**	**1,408,500**	**0**	**2,491,966**
II) Recovery and sustainability of depleted fisheries and living marine resources, including Mariculture	IIa) Demonstrate regional stock assessment methods including regional surveys (Regional Demonstration Project)	5,048,066	9,014,022	2,631,532	300,000	1,034,424
	IIb) Identify and utilize optimal methods and estimates for maximum sustainable yields for dominant commercially important fisheries species	2,034,000	2,785,737	332,000	300,000	119,737
	IIc) Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project)	1,928,635	3,903,835	334,200		1,641,000
	IId) Develop Regional Agreements and Regional Fisheries Commission	262,500	675,081	56,500		356,081
	IIe) Assess and draft modifications to the National Legal Frameworks to achieve sustainable fisheries	1,033,200	1,556,575	223,000		300,375
	IIf) Develop Fisheries Management Plans for at least three fisheries	1,175,000	2,729,700	1,397,000		157,700
	IIg) Assess existing coastal aquaculture and Mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP	2,117,150	2,486,002	261,300	45,200	62,352
	Angola	1,180,000		375,000		
	Benin	170,000		85,000		
	Cameroon	1,175,000		280,000		
	Congo	2,743,000		14,350		
	Democratic Republic of the Congo	440,000		82,000		
	Cote d'Ivoire	1,080,000		227,000		
	Gabon	344,000		47,000		
	Ghana	0		0		
	Equatorial Guinea	0		0		
	Guinea	2,275,000		2,050,000		

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
	Guinea-Bissau	2,070,000		508,000		
	Liberia	23,051		30,182		
	Nigeria	650,000		100,000		
	Sao Tome and Principe	1,000,000		200,000		
	Sierra Leone	125,500		1,167,000		
	Togo	323,000		70,000		
	Total Objective	**13,598,551**	**23,150,952**	**5,235,532**	**645,200**	**3,671,669**
III) Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa) Develop Regional Biodiversity Action Plan, including Protected Areas building on existing national Biodiversity Action Plans (National Demonstration Project)	8,680,500	10,408,891	662,500		1,065,891
	IIIb) Demonstrate restoration of priority mangrove areas (National Demonstration Project)	15,877,800	18,004,800	1,237,000		890,000
	IIIc) Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH) for habitat protection (National Demonstration Project)	18,847,000	22,581,200	2,865,000	45,200	824,000
	IIId) Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control	55,531,500	56,673,958	852,000		290,458
	IIIe) Review and update national legislation and draft Perform gap analysis of national legislation, and draft improvements to legislation regarding on key elements of biodiversity identified in the TDA, introduced species, and habitats, etc.	716,500	1,061,054	96,000		248,554
	IIIf) Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National Demonstration Project)	452,612,937	457,829,916	4,282,400		934,579
	Angola	510,000		240,000		
	Benin	320,000		70,000		

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
	Cameroon	2,630,000		1,132,000		
	Congo	805,500		0		
	Democratic Republic of the Congo	545,000		30,000		
	Cote d'Ivoire	1,990,687		352,000		
	Gabon	233,000		59,000		
	Ghana	0		0		
	Equatorial Guinea	0		0		
	Guinea	850,000		90,000		
	Guinea-Bissau	1,500,000		359,000		
	Liberia	24,550		24,400		
	Nigeria	542,500,000		7,510,000		
	Sao Tome and Principe	200,000		40,000		
	Sierra Leone	40,500		54,000		
	Togo	117,000		34,500		
	Total Objective	**552,266,237**	**566,559,819**	**9,994,900**	**45,200**	**4,253,482**
IV) Reduce land and sea-based pollution and improve water quality	IVa) Facilitate development of regionally-integrated and consistent National Programmes of Action for Land-Based Activities, including updating inventories of pollution and habitat hot spots	153,884,750	158,248,022	3,831,285		531,987
	IVb) Develop and implement a Regional Programme of Action for Land-Based Activities	974,447	1,779,047	256,550	548,050	0
	IVc) Develop a protocol on LBA for the Abidjan Convention	795,280	1,702,170	228,890	678,000	0
	IVd) Regional assessment of marine maritime pollution prevention measures, contingency planning, and spill response capabilities	62,952,130	70,309,907	6,967,470		390,307
	IVe) Development of regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation)	455,500	750,000	114,500		180,000

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
	IVf) Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL, OPRC) as related to oil and gas activities	193,510	373,471	44,280		135,681
	IVg) Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (National Demonstration Project)	979,495	3,141,530	226,135	600,000	1,335,900
	IVh) Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA	538,000	852,306	177,000		137,306
	Angola	2,937,600		477,500		
	Benin	870,000		315,000		
	Cameroon	955,000		208,000		
	Congo	2,000,000		0		
	Democratic Republic of the Congo	100,000		7,000		
	Cote d'Ivoire	1,232,000		207,000		
	Gabon	319,500		60,500		
	Ghana	6,580,000		5,800,000		
	Equatorial Guinea	0		0		
	Guinea	2,575,000		411,000		
	Guinea-Bissau	2,185,000		473,000		
	Liberia	91,512		105,610		
	Nigeria	200,000,000		3,500,000		
	Sao Tome and Principe	645,000		156,000		
	Sierra Leone	30,500		25,500		
	Togo	252,000		100,000		
	Total Objective	**220,773,112**	**237,156,453**	**11,846,110**	**1,826,050**	**2,711,181**
V) Regional coordination and institutional sustainability	Va) Develop a regional project coordination mechanism	2,725,200	7,935,074	633,900	768,400	3,807,574
	Vb) Develop effective Steering Committee	361,500	659,092	79,000		218,592
	Vc) Establish Intersectoral/ Interministerial/ Ministerial Coordination	313,500	612,000	98,500		200,000

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
	Vd) Idendify, strengthen and involve stakeholders	796,000	1,774,505	135,000		843,505
	Ve) Develop Environmental Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project)	893,000	2,082,600	194,000		995,600
	Vf) Monitoring and Evaluation (M&E)	430,000	1,048,580	90,000	230,000	298,580
	Vg) Develop regional coordination mechanism (an Interim Guinea Current Commission, followed by a full-time Commission)	150,000	416,258	29,500		236,758
	Vh) Provide capacity building for the IGCC	603,000	811,900	116,500		92,400
	Angola	0		0		
	Benin	170,000		80,000		
	Cameroon	290,000		57,000		
	Congo	0		0		
	Democratic Republic of the Congo	205,000		13,500		
	Cote d'Ivoire	323,000		52,500		
	Gabon	199,500		34,500		
	Ghana	346,000		60,000		
	Equatorial Guinea	0		0		
	Guinea	1,170,000		75,000		
	Guinea-Bissau	2,585,000		515,000		
	Liberia	4,700		3,900		
	Nigeria	550,000		100,000		
	Sao Tome and Principe	180,000		100,000		
	Sierra Leone	78,000		30,000		
	Togo	171,000		255,000		
	Total Objective	**6,272,200**	**15,340,009**	**1,376,400**	**998,400**	**6,693,009**
	Total Project Costs	**799,986,100**		**30,356,442**	**3,514,850**	**19,821,337**
	UNIDO		**991,067**			**991,067**

Component	Sub-Component	Baseline (B)	Alternative (A)	Increment (A-B)		
				Gov'ts	Other	GEF
	PDF-B		637,000			637,000
	Total Project Budget	799,986,100	855,300,796	30,356,442	3,514,850	21,449,404

ANNEX B

LOGFRAME MATRIX

Component	Intervention Logic	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
	Long-term Development/Environment Objective: To create a regional management framework for sustainable use of living and non-living resources in the GCLME.	Regional coordination office established by end of year 1; Updated TDA available and agreed upon; Revised SAP available and endorsed at Ministerial level; Agreed set of environmental indicators to monitor progress of SAP implementation; Protocol to the Abidjan Convention of land-based activities; National Plans of Action completed; Establishment of IGCC	Steering Committee (SC) annual reports; Project files and documents; Working group and technical reports; Annual project review; Country Interministerial Coordinating Committee reports	Assumes continued national commitment to the regional program at each sector level, including offer of national resources. The ability of SC and RCU to formulate and implement community-based solutions relies on the support of national agencies through coordinated (but independent) actions. The GEF project will create a model that can be adopted in the future as a permanent activity of the individual national sectors. Broad stakeholder participation will be essential to achieve sustainability.
	Project Purpose: Updating of Transboundary Diagnostic Analysis (TDA) and formulation of a Strategic Action Programme (SAP). Facilitation of the initial steps implementing SAP to manage shared coastal and marine resources and achieve sustainable development for the GCLME. Develop a mechanism to objectively measure effects of management actions.		TDA published and broadly disseminated; Countries endorse SAP; National and donor commitments to financing SAP; Project files and working group reports	Remedial actions can be costly and/or unpopular in some sectors. A well-designed monitoring and evaluation program will provide objective technical information with which to assess the success (or failure) of specific management actions and can be used to adjust future actions.

***Component 1**: Finalize SAP and develop sustainable financing mechanisms for its implementation*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
OUTCOMES	• Regional monitoring capacity developed • TDA updated and widely disseminated • NAPs and Regional SAP developed and endorsed • Commitments to SAP implementation obtained • Sustainable financing arrangements formulated • Economic instruments and incentives developed	Completion of TDA Endorsement of NAPs and Regional SAP Sustainable financing arrangements report Economic instruments report	Existence of TDA, Project files Letters of endorsement, Project files Working group reports, Project files Working group reports, Project files	
ACTIVITIES	Ia) Fill gaps in regional monitoring methods/standards/etc. by training and at-sea demonstrations for contaminant levels in water, sediments, and biota. • Develop and implement regional training courses in monitoring methods for coastal and marine pollution (oceanography, chemistry) • Perform regional at-sea sampling for practical training in acquisition of sediment, water-column, and biota samples for characterization of priority pollutants	Training courses completed and at least 5 training sessions held. At-sea sampling conducted and priority pollutants characterized	RCU files, training course curricula RCU files, sampling completion reports	Assumes countries will allow monitoring of their coastal waters.
	Ib) Identify and fill gaps for the TDA, including biodiversity, socio-economic conditions, legal/ regulatory review, stakeholder analysis, hot spots, contaminant levels, etc. • Develop work plan for filling gaps based on initial TDA, after reviewing and refining the gaps • Develop regional working groups to fill gaps • Acquire new data through targeted field sampling and analysis	Work plan completed Regional working groups developed Targeted field sampling and analysis conducted	RCU files Working group reports Working group reports	Assumes additional data are available to fill in gaps from initial TDA.

***Component 1**: Finalize SAP and develop sustainable financing mechanisms for its implementation*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	Ic) Update TDA following filling of gaps • Establish regional TDA working group • Using new data from project and other sources, update TDA • Widely disseminate TDA to stakeholders, governments, and other regional project	Working groups established TDA updated TDA disseminated	Working group reports Project files Project website, project files	Assumes additional data are available to fill in gaps from initial TDA.
	Id) Prepare and endorse National Action Plans • Develop training modules for development of National Action Plans • Implement national and regional training on National Action Plans • Establish national teams to develop NAPs • Perform internal consensus-building for NAP through broad stakeholder, intersectoral and Interministerial processes • Obtain national endorsement of NAP at highest level	Training modules developed Training implemented Teams established Consensus-building performed National endorsement obtained	Training materials, project files Training meeting reports, project files Project files Project files, APR Endorsement letters	Assumes countries use NAP money wisely and develop NAPs.
	Ie) Finalize and endorse regional Strategic Action Programme • Develop regional working group for SAP following development of draft NAPs • Through national and regional workshops, develop consensus on elements of updated SAP • Finalize SAP • Obtain endorsement of SAP at highest levels in each country	Regional working group developed National and regional workshops held SAP finalized SAP endorsement obtained	Working group meeting notes, project files Workshop reports, project files Project files SC meeting minutes, endorsement letters	Assumes continued national commitment to the project.
	If) Hold a donors' conference to mobilize commitments to SAP implementation • After SAP is endorsed, organize and host a donors' meeting to mobilize commitments to SAP implementation • Formalize SAP commitments through appropriate memoranda, agreements, etc., at national or regional level as appropriate	Donors' meeting held SAP commitments obtained	Meeting notes, project files Memoranda or agreements, project files	Assumes continued donor and national commitment to implementing SAP activities.

***Component 1**: Finalize SAP and develop sustainable financing mechanisms for its implementation*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	Ig) Formulate arrangements for sustainable financing of environmental management of the GCLME			Financial and motivational means must be identified to develop national institutions and the private sector into sustainable contributors of the project.
	• Develop consultation process to determine costs for long-term environmental management, who pays, how it is paid, and legal and operational aspects (links with Interim Guinea current Commission)	Consulting process determined and suggestions for payments of costs made	TORs, Project files	
	• Develop linkages with existing institutional arrangements (regional and supra-regional, such as the Abidjan Convention), and international collaborations (such as with IMO)	Linkages established with existing institutional arrangements	Letters of intent/commitment by relevant institutions and authorities	
	Develop and recommend economic instruments and incentives to promote preventive measures to decrease both land and sea-based sources of pollution as well as promote adequate environmental management in the region			Assumes economic incentives will lead to reductions in pollution.
	• Identify tools such as conservation easements, land-use zoning, property rights, and other types of incentives to control pollution and encourage the adoption of less polluting technologies	Economic incentives identified	Project files; Final report	
	• Identify incentives for private sector participation in monitoring and prevention of pollution	Private sector incentives identified	Project files; Final report	
	• Identify and assist in the improved quantification of economic benefits of land-based and maritime pollution prevention, including, for example, reduced insurance costs, protection of tourism assets, fisheries resources, etc.	Economic benefits identified and quantified	Project files; Final report	

Component 2: *Recovery and sustainability of depleted fisheries and living marine resources including Mariculture.*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
OUTCOMES	• Regional surveys demonstrated and stock assessment mechanism developed • Maximum sustainable yields estimated • Capacity for conducting carrying capacity analyses developed and analyses conducted • Regional agreements and Regional Fisheries Commission developed • Modifications to National Legal Frameworks to achieve sustainable fisheries drafted • Fisheries Management plans developed for at least three fisheries • Environmentally sustainable capacity for aquaculture and Mariculture determined	Regional stock assessment demonstration project completed Report on maximum sustainable yields Carrying capacity analyses completed Establishment of Regional Fisheries Commission Legal modifications drafted Management plans in place Report on aquaculture capacity completed	Demonstration project completion report, Project files Working group report, Project files Working group report, Project files Existence of Regional Fisheries Commission Working group report, Project files Working group report, Project files Working group report, Project files	
ACTIVITIES	IIa) Demonstrate regional stock assessment methods including regional surveys (Regional Demonstration Project) • Review of existing data and diagnosis of condition of stocks • Develop common methodology for joint regional stock assessment and perform initial joint regional stock assessment. • Perform demonstration of a Regional Survey, including oceanography, ecological, and introduced species sampling • Determine a mechanism for an on-going 1-2 year stock assessment	Fisheries stocks status reports Common methodology developed Regional Survey demonstrated Mechanism for on-going stock assessment determined	Status reports, Project files Stock assessment, Project files Project files Project files	Assumes the countries will agree to perform a joint stock assessment. The risk is low since this is one of the priority actions identified during the PDF-B phase.
	IIb) Identify and utilize optimal methods and estimates for maximum sustainable yields for dominant commercially important fisheries species • Through workshops, identify	Workshops held, Draft methods developed	Workshop notes, Project files	Assumes countries will agree on methodology for estimating maximum sustainable yields for dominant fisheries and that countries will agree to implement and adhere to fishery yields.

Component 2: *Recovery and sustainability of depleted fisheries and living marine resources including Mariculture.*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	appropriate methods for estimating maximum sustainable yields for dominant fisheries • Based on demonstration of regional stock assessment, estimate maximum sustainable yields for dominant fisheries • Through the Guinea Current Fisheries Commission (see Component II, subcomponent 4), perform annual or every-two-year estimates of maximum sustainable yields for purposes of setting fisheries quotas no commercial important species in the region	Maximum sustainable yields estimated Maximum sustainable yields estimated annually or every two years	Working group reports, Project files GCFC reports, project files	
	IIc) Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project) • Perform iterative series of analysis of carrying capacity (productivity assessments and plankton surveys regional demonstration project) • Review existing state-of-knowledge and preliminary carrying capacity analysis (retrospective) and define gaps	Analyses completed and published Analysis completed and gaps defined	TORs, Demonstration project completion report, Project files Project files	Relies on political will to fund ongoing regional efforts for conducting studies on living marine resources.
	IId) Develop Regional Agreements and Regional fisheries Commission • Develop, negotiate, endorse and ratify regional agreement for sustainable use of fisheries resources • Establish a Guinea Current Fisheries Commission and explore mechanism for sustainability	Regional agreement ratified GCFC established	SC meeting minutes, ratification of regional agreement Existence of GCFC	Assumes that countries are willing to ratify and adhere to regional fisheries agreements. The risk is low since this is one of the priority actions identified during the PDF-B phase.
	IIe) Assess and draft modifications to the National legal Frameworks to achieve sustainable fisheries • Review existing national laws and regulations on fisheries and Mariculture	Review completed	Report completed, Project files	Assumes that countries are willing to revise and harmonize national legal frameworks.

Component 2: *Recovery and sustainability of depleted fisheries and living marine resources including Mariculture.*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	and pertinent international agreements such as FAO Code of Conducts (various), straddling stocks, WSSD fisheries agreements, etc. • Draft modifications to national laws and regulations on fisheries • Facilitate the approval of new or reformed laws and regulation in fisheries	Legal modifications drafted Approval of legal changes facilitated	Legal review and modifications completed, Project files Project files	
	IIf) Develop fisheries Management Plans for at least three fisheries • Develop and facilitate Regional fisheries management plans, including regional recovery programme for at least three single or multi-species stock using adaptive approach fisheries. • Through the Guinea Current Fisheries Commission, conduct adaptive management of these fisheries	Fisheries management plans developed including regional recovery programme Fisheries management plans implemented; status report published	Working group reports, Project files Project files	Maintenance of sustainable fish populations will require the reduction of system stresses, including chemical contamination and fishing pressure. Such remedial actions directly affect individuals or organizations now doing business in the region and identification/ education of stakeholders will be necessary for compliance with these actions.
	IIg) Assess existing coastal aquaculture and Mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP • Review existing status and trends and environmental impact of coastal aquaculture and Mariculture • Determine maximum practical limits on coastal aquaculture and Mariculture based on analysis of environmental effects of such activities • Develop guidelines for best environmental practices as they relate to aquaculture and Mariculture • At national levels, assure laws and regulations governing coastal aquaculture and Mariculture reflect the	Status and trends report completed Maximum limits determined Guidelines for best environmental practices developed	Working group reports Working group reports, Project files Working group reports, Project files	Implementation of best environmental practices requires the full participation of stakeholders.

Component 2: *Recovery and sustainability of depleted fisheries and living marine resources including Mariculture.*		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	limits developed under this project and best environmental practices	Modifications to coastal and aquaculture laws drafted.	Legal analysis, Project files	
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Component 3: Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
OUTCOMES	• Regional Biodiversity Acton Plan developed, building on NBSAPs where available • Demonstration of restoration of priority mangrove areas completed • Use of ICARM and PADH demonstrated • Status of introduced species and their threats to the region's biodiversity assessed • Modification to national biodiversity laws drafted • Mitigation strategies for restoring eroded coastal areas developed	Demonstration projects completed Status of introduced species better understood Mitigation strategies developed	Project files, Existence of Regional Biodiversity Action Plan Demonstration project completion reports, Project files Working group reports, Project files Working group reports, Project files Working group reports, Project files	
ACTIVITIES	IIIa) Develop Regional Biodiversity Action Plan, including Protected Areas building on National Biodiversity Action Plans (National Demonstration Project) • Organize a workshop to identify the elements for a regional Biodiversity Action Plan, including National Activity 1. Review existing national practices of coastal habitat use, conservation, and restoration, protected areas, list of rare and endangered species, etc. • Elaborate a draft regional Biodiversity Action Plan and carry out a broad regional consultation on the proposed regional Biodiversity Action Plan.	Workshop held and report completed on biodiversity Draft regional Biodiversity Action Plan completed and disseminated	Workshop meeting notes, Project files SC meeting minutes, Project website, Project files	Assumes national commitment to adopting a regional biodiversity strategy and willingness to endorse regional biodiversity agreements.

Component 3: Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	Using National Biodiversity Action Plans and other sources, identify priority biodiversity areas and issues of regional concern • Promote the endorsement and implementation of the regional Biodiversity Action Plan. Review existing and proposed protected areas, and develop regional strategy for protected areas • Review existing and proposed rare and endangered species, and develop regional list of rare and endangered species requiring special protection • Through a participatory process, develop, review and nationally endorse Regional Biodiversity Action Plan	Regional Biodiversity Action Plan promoted and regional protected areas strategy developed List of rare and endangered species completed Regional Biodiversity Action Plan nationally endorsed	Working group reports, Project files Working group reports, Project files National letters of endorsement, SC meeting minutes, Project files	
	IIIb) Demonstrate restoration of priority mangrove areas (National Demonstration Project) • Identify priority mangrove areas in the region (Nigeria for restoration, based on ecosystem approach • Finalize adaptive management and implementation plan for restoration of mangrove areas, including clearing, cleaning, planting, monitoring, and annual review of restoration approaches • Monitor, evaluate, and disseminate results of Demonstration Project	Priority mangrove areas identified Restoration plan completed Results widely disseminated	Demonstration project progress reports, Project files Demonstration project progress reports, Project files Demonstration project completion report, Project website, Project files	Assumes that the restoration project completed in Nigeria could be replicated in other coastal countries.
	IIIc) Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH for habitat protection (National Demonstration Project)			Assumes country willingness to implement ICARM principles

Component 3: Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	• Using ICARM and PADH methodology, finalize approach for demonstration project on Integrated Coastal Management • Implement demonstration project. Monitor, evaluate and disseminate results of Demonstration Project	Demonstration project approach completed Demonstration project completed and results disseminated	Demonstration project progress reports, Project files Demonstration project completion report, Project website, Project files	
	IIId) Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control • Prioritize national and regional risks and threats from introduced species by researching the numbers, ecological niches, and spread of introduced species, as well as their method of introduction (based in part on results of regional survey of Component II) • Working with IMO and GloBallast, determine extent of introduction of alien species in ballast water, through cooperation with regional task force, communication and public awareness, training, port biota baseline surveys (part of national activities and regional survey in demonstration project of Component I), risk assessment and incorporation into National Regional Action Plans	Risk prioritization completed Extent of species introduced through ballast water determined and mitigation measures implemented	Working group reports, Project files Working group reports, Project website, Project files, Regional task force MOU	Proposals for regulation and control of exotic species must be agreed upon and implement by all countries in order for them to be effective due to the inherent transboundary nature of exotic species.
	IIIe) Perform gap analysis of national legislation and draft improvements to legislation regarding key elements of biodiversity identified in the TDA, introduced species, and habitats, etc. • Review existing national laws and	Legal and regulatory review	Working group reports, Project files	Effective environmental resource protection derives from a combination of regulatory and non-regulatory actions. Before recommendations for effective regulatory changes can be made, a survey of existing national and international regulations needs

Component 3: Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	regulations on biodiversity • Draft modifications to national laws and regulations on biodiversity • Facilitate the approval of a new or reformed laws and regulation in biodiversity • Relying on existing information such as National Environmental Action Plans and other previous documents, determine gaps in laws of each of the 16 GCLME countries, concerning land-based activities, marine-based pollution, introduced species, fisheries, and related areas of concern	completed Legal modifications drafted New laws and/or regulations approved Gap analysis completed	 Working group reports, Project files Copies of approved laws/regulations, Project files Working group reports, Project files	to be performed.
	IIIf) Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National Demonstration Project) • As part of filling gaps in TDA, review regional littoral sediment budgets and evaluate changes to sediment budget arising from human activities (damming rivers, interrupting littoral sediment drift, sand mining, etc.) • Based on priorities of human impacts on littoral sediment budgets, recommend cost-effective mitigation strategies for restoring littoral transport and sand resources (e.g., dredging in reservoirs and restoring sediment to rivers; redesign and modification of major shoreline structures interrupting littoral transport such as in ports, harbors,	 Regional sediment budgets reviewed and included in TDA Recommendations for cost effective mitigation strategies completed	 TDA, Project website, Project files Working group reports, Project files	Assumes country and/or donor willingness to fund mitigation strategies for restoring natural littoral sediment flow. In some cases, sediment flow is disrupted by critical national infrastructure such as dams and ports so there is a risk that action will not be taken. Countries have identified coastal erosion as a priority issue, however, and have expressed willingness to address the problem so the risk is minimal.

Component 3: Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	breakwaters, etc.; elimination of beach and near-shore sand mining • Review existing incidences and baseline information on coastal erosion and develop strategies for coastal erosion control (National Demonstration Project: Cote D'Ivoire)	National demonstration project completed and results disseminated	Demonstration project completion reports, Project files, Project website	

Component 4: Reduce land and Sea-based pollution and improve water quality		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
OUTCOMES	• Regionally-integrated and consistent National Programmes of Action for Land-Based Activities developed • Regional Programme of Action for Land-Based Activities developed and implemented • LBA Protocol for the Abidjan Convention developed • Regional assessment of marine pollution prevention measures, contingency planning and spill response capabilities completed • Regional system for cooperation in cases of major marine pollution incidents created • Legislative reforms in selected countries to adopt and implement international conventions related to oil and gas activities facilitated • Investment opportunities for the SAP to reduce ecosystem threats developed	National and Regional Programmes of Action focus on priority land-based sources Regional pollution prevention measures assessed and cooperation system in place Legal modifications drafted	Existence of National and Regional Programmes of Action; Project files Existence of LBA Protocol Working group reports; Project files Project files Working group reports, Project files Workshop reports, Project files	
ACTIVITIES	IVa) Facilitate development of regionally-integrated and consistent National Programmes of Action for Land-Based Activities, including updating inventories of			Assumes countries will use the NPA money wisely and will develop NPAs.

Component 4: Reduce land and Sea-based pollution and improve water quality		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	pollution and habitat hot spots • Assist countries in developing realistic and regionally-integrated National Programmes of Action from land-based sources of pollution and activities • Determine and address training needs in the region for LB sources of pollution and activities and sources • Develop Regional/ Governmental/ Private Sector partnerships on LB activities and sources of pollution • Identify, strengthen, and involve Stakeholders in LBS issues in the Region, including their involvement in Monitoring and Evaluation, as well as development of performance indicators • Develop and implement a West and Central African regional node of the GPA Clearinghouse Mechanism	Contracts to countries to develop NPAs, NPAs developed Training needs assessed and curricula developed; Training workshops held Partnerships developed on land-based activities Public participation plan developed and implemented, stakeholders fully involved GPA Clearinghouse	Existence of NPAs, SC meeting minutes, APR, Project files Workshop curricula, Workshop reports, Project files MOU letters on partnership, Project files Existence of Public Participation Plan, Project files, Project website Existence of GPA Clearinghouse Mechanism, Clearinghouse materials, newsletter, website	

Component 4: Reduce land and Sea-based pollution and improve water quality		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
		Mechanism established		
	IVb) Develop and implement a Regional Programme of Action for Land-Based Activities • Based on National Programmes of Action, develop a Regional Programme of Action for Land-Based Activities facilitating partnerships between national governments and regional organizations in the private sector and civil society • Work with governments and stakeholders to obtain broad support for Regional Programme of Action and NPAs • Promote the Regional Programme of Action and broadly distribute RPA through public awareness campaign	Regional Programme of Action developed Support garnered for Regional Programme of Action Regional Programme of Action broadly disseminated	Existence of Regional Programme of Action, Project files Letters of support and partnership agreements between governments and private sector, Project files Project website, Project files	Assumes willingness of private sector and civil society to partner with governments and regional organizations to promote the Regional Programme of Action. The private sector and civil society have already participated in the beginning stages of this project to some degree so the risk of their not participating is low.
	IVc) Develop a protocol on LBA for the Abidjan Convention • Identify, strengthen and involve key stakeholders in preparation and development of protocol through sub-regional and regional stakeholder workshops as well as legal and technical expert meetings • Review gaps in National regulatory/ legislative framework including the review of the status of the appropriate regional/ international convention by GCLME participating countries, and assist in developing plans for those that have not yet ratified the Abidjan Convention • Develop, negotiate, ratify and obtain approval for the Protocol to the Abidjan Convention with Annexes on Land-	Stakeholder and legal and technical expert meetings held Legal/regulatory gaps reviewed and ratification of Abidjan Convention assisted Protocol drafted, distributed and ratified	Meeting notes, Project files Legal/regulatory report; Ratification of Abidjan Convention by all GCLME countries, Project files, Convention Secretariat Project files, Convention Secretariat	None

Component 4: Reduce land and Sea-based pollution and improve water quality		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	Based Activities and sources of Pollution			
	IVd) Regional assessment of marine maritime pollution prevention measures, contingency planning, and spill response capabilities • Conduct a survey of the existing integrated approach/ system for the management of all types of marine wastes in port cities and towns • Conduct a survey/ study on port reception facility requirements and costs in some of the countries • Review the region's maritime infrastructure with particular regard for survey and inspection requirements as set out in IMO Conventions • Assess marine pollution, preparedness and response system for oil spill, and spill-combating equipment needs in each of the countries • Provide advisory services to address specific maritime safety and marine environmental problems on the request of the countries of the region and for the organization and implementation of activities related to *Prevention of Pollution from Shipping Activities-Implementation of MARPOL 73/73; Port State Control (PSC); Marine Pollution Preparedness and Response;* assist with the development/ completion of National Contingency Plans • Implement training through global/ regional/ national seminars, workshops, etc., and individual fellowships; provide assistance in developing the national	Marine waste management survey completed Survey on port reception facility requirements completed Review of maritime infrastructure completed Assessment of oil spill response completed Advisory services provided by technical working group and countries requesting assistance Global/regional/national seminars and workshops held, National systems for oil spill	Working group reports, Project files Working group reports, Project files Working group reports, Project files Working group reports, Project files Technical working group reports on requests from countries for assistance, Project files Seminar and workshop reports, Project	Assumes willingness on part of port owners/authorities and national/regional maritime authorities to enact modifications, harmonize guidelines and cooperate to prevent/mitigate spills.

Component 4: Reduce land and Sea-based pollution and improve water quality		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	systems for oil spill response (institutional capacity building) • Assess equipment, facilitating the provision of pollution response equipment, and production and dissemination of training materials, etc. • Create public awareness regionally on certain aspects of the project activities	response developed Assessment equipment completed and training materials developed Public awareness raised	files, Report on national system for oil spill response Existence of training materials, Project files Project website, Public awareness materials, Project files	
	IVe) Development of regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation) • Evaluate need for and duties of regional emergency response centers • Develop sub-regional/ regional contingency plans and agreement for cooperation • Develop sub-regional/ regional/ inter-regional systems for cooperation in cases of major marine pollution incidents	Emergency response center evaluation completed Contingency plan and cooperation agreements completed Cooperation systems developed	Project files Existence of cooperation agreements, Project files Working group reports, Project files	Assumes countries will agree to cooperate on joint emergency preparedness and response
	IVf) Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL, OPRC) as related to oil and gas activities • Hold high-level meeting of government officials and parliamentarians with IMO and other personnel to discuss conventions related to oil and gas sector, including their benefits and obligations • If requested, provide technical	Meeting held to discuss conventions	Meeting notes, Project files	Assumes commitment of countries to reform legislation and implement international conventions.

Component 4: Reduce land and Sea-based pollution and improve water quality		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	assistance to countries in translating the provisions of the Conventions into their national legislation	Technical assistance provided	Technical working group files, Project files	
	IVg) Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (National Demonstration Project) • Based on an identified priority nutrient input, conduct demonstration project on controlling nutrient fluxes to the coastal environment • Monitor, evaluate and broadly disseminate the results of the Demonstration Project throughout the region	Demonstration project on controlling nutrient fluxes completed Results broadly disseminated	Demonstration project reports, Project files Project website, Project files	Assumes that capable and responsible parties will execute the projects.
	IVh) Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA • Based on demonstration projects, and through broad stakeholder involvement, conduct two regional workshops to develop ideas for investment opportunities for the SAP to reduce ecosystem threats • Based on priority investments identified through the public participation process, develop at least three of these investments for the SAP process	Workshops held and investment opportunities developed Three investments developed	Workshop reports, Project files Project files	Assumes country/donor/private sector willingness to make investments in reducing ecosystem threats.

Component 5: Regional coordination and institutional sustainability		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
OUTCOMES	• Regional project coordination mechanism • Steering Committee developed • Intersectoral/Interministerial/ Ministerial Coordination established	RCU, Steering Committee and Intersectoral/Interministerial/ Ministerial Coordination mechanism in place	Project files, SC meeting minutes	

Component 5: Regional coordination and institutional sustainability		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	• Stakeholders actively involved in project activities • GCLME Environmental Information System established • Monitoring and Evaluation conducted • Regional coordination mechanism developed • Capacity developed for the IGCC	Public participation plan implemented EIS in place Effective IGCC in place	Stakeholder plan and report Project website, Project files, Existence of EIS Monitoring reports, Project files IGCC meeting minutes	
ACTIVITIES	Va) Develop a regional project coordination mechanism • Staff, equip, and start a Regional Coordination Unit (RCU) • Develop national project coordination structures in each country, and linkages with the RCU	Coordination office opened and staff hired, 8 regional coordination meetings held by end of year 4 National project coordination structures developed	SC meeting minutes SC meeting minutes, Project files	The program must effectively communicate the issues and the suggested remedies to the national sectors and be responsive to national real and perceived needs.
	Vb) Develop effective Steering Committee • Demonstrate value of project to high National Officials to assure continued project support at high levels • Conduct once or twice-yearly Steering Committee meetings for Governance of Project and Project M&E • Include broad stakeholder participation in Steering Committee activities to assure project clarity and transparency through providing observer status to civil society and NGOs	5-10 Steering Committee meetings held by end of year 4 Stakeholders involved in SC meetings and SC activities	SC meeting minutes SC meeting minutes	The program must effectively communicate the issues and the suggested remedies to the national sectors and be responsive to national real and perceived needs.
	Vc) Establish Intersectoral/ Interministerial/ Ministerial Coordination • Determine appropriate national Intersectoral, Interministerial, and/or Ministerial coordination requirements to assure broad participation in project • Establish clear communications procedures nationally and regionally to track, monitor and facilitate project execution	Coordination requirements determined Clear communications established	SC meeting minutes, Project files SC meeting minutes, Project files	The program must effectively communicate the issues and the suggested remedies to the national sectors and be responsive to national real and perceived needs.

Component 5: Regional coordination and institutional sustainability		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	Vd) Identify, strengthen and involve stakeholders • Develop a public participation and awareness (PPA) workplan for the project • Implement the PPA workplan involving national experts, private sector, NGOs and other interested parties • Establish regional information networks and information exchange mechanisms to disseminate information in West and Central Africa through newsletters, a web page, and publications on the progress of the project in order to enhance the replication of successful experiences (within the framework of the Abidjan Convention) • Integrate private sector involved in GCLME development (industry, shipping, fisheries, tourism) into activities of this project, as appropriate as sub-contractor, consultant or co-sponsor of specific activities • Promote international support and networking for the action program including a mechanism for periodic independent reviews and reporting of results; this should include a role for IMO • Develop and conduct training workshops for stakeholders	PPA workplan developed and approved by SC and UNEP/UNDP PPA committee established and holds 8 meetings Country-based and regional workshops held Website developed and online Newsletters and publications created and distributed to 400 stakeholders Private sector actively participating in project in workshops and working groups and as co-sponsor of activities Independent reviews conducted and results reported Training workshops held	SC meeting minutes, UNDP/UNEP review reports PPA committee meeting reports, Stakeholders' participation reports Workshop meeting notes, Project files Existence of website Existence of public awareness materials Workshop reports, Working group reports, SC minutes Project files Reports from training courses	Routine and effective involvement by stakeholder in planning, management and decision-making can only be accomplished by on-going encouragement, strengthened capacities and financial commitment by donors and countries. Barriers to broaden stakeholder participation must be removed. The project assumes support of the private sector in funding and carrying out activities.
	Ve) Develop Environmental Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project) • Building on existing institutional arrangement where feasible, establish a Data and Information Management System for the GCLME to facilitate the	DIMS established	Existence of DIMS, Demonstration project completion report	Assumes that capable and responsible parties will execute the projects.

Component 5: Regional coordination and institutional sustainability		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	updating of the TDA and data sharing with other regional projects • Develop mechanisms for the sharing of data and information for input into the Data and Information Management System for the GCLME • Create standards and protocols for the collection, processing, analysis and compilation of data and GIS information • Develop a centralized system for access and distribution of the data to the organizations involved in the GCLME project, as well as other stakeholders • Support all aspects of the GCLME project in their data and information requirements	Data sharing mechanisms developed and in place Standards and protocols created Data distribution system developed Project data needs supported	Project files Working group reports, Project files Demonstration project completion reports, Project files Project files	
	Vf) Monitoring and Evaluation (M&E) • Perform annual TPR, APR, PIR • Perform mid-term and final evaluations • Develop GEF IW indicators and monitoring system to evaluate progress on achieving indicators	Reviews completed Evaluations completed Indicators and monitoring system developed	Project files, UNDP/UNEP/UNIDO reports Project files, UNDP/UNEP/UNIDO reports	None.
	Vg) Develop regional coordination mechanism (an Interim Guinea Current Commission, followed by a full-time Commission) • Develop regional consensus on the responsibilities, duties, structure, and authorities of a GCC and linkages to the Abidjan Convention and other LME projects (e.g., BCLME) • Through a regional agreement, formally establish the GCC • Develop sustainable financing mechanisms for the GCC	Regional consensus developed GCC established Sustainable financing mechanism developed	Agreement on GCC, Project files, SC meeting minutes Regional agreement signed, SC meeting minutes, Project files Project files, SC meeting minutes	Financial and motivational means must be identified to develop national institutions and/or the private sector into sustainable contributors to the project.
	Vh) Provide capacity building for the IGCC			Assumes country support for a regional

Component 5: Regional coordination and institutional sustainability		**Objectively Verifiable Indicators**	**Sources of Verification**	**Assumptions and Risks**
	• Once the responsibilities, duties and authorities of the GCC are established and agreed upon, develop training modules to enhance capacities of this body	Training modules developed	Project files, GCC reports	coordination mechanism.
	• Facilitate the start-up of the GCC through technical assistance, transfer of equipment and communications facilities	Technical assistance, equipment and communications facilities provided	Project files, GCC reports	

ANNEX C

STAP REVIEW AND RESPONSE

C: REVIEW:

Combating living resource depletion and coastal area degradation in the Guinea Current LME through ecosystem-based regional actions

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Basis for the proposal:

The Guinea Current Large Marine Ecosystem (GCLME), the shared transboundary waters off the coast of western Africa, is an important reservoir of rich marine biological diversity of global significance and an important world fishery. Due to increasing urbanization and industrialization in the region, this marine ecosystem has been threatened by a number of anthropogenic activities such as over-exploitation of fishery resources, impacts from the land-based settlements and activities from industrial, agricultural, urban and domestic sewage run-off and other mining activities. The depletion of living resources, uncertainty in ecosystem status (including climate change effects), deterioration of water quality, and loss of habitats (including coastal erosion) have been identified as significant transboundary environmental problems in the GCLME region. Hence, there is an increasing recognition among the countries in this region that co-operation in establishing a regional management framework for sustainable use of living and non-living resources in the GCLME is urgently needed.

Goals and expected outcomes:

The overall development goal of this project is to create a regional management framework for sustainable use of living and non-living resources in the GCLME. Priority action areas include reversing coastal area degradation and living resources depletion, relying heavily on regional capacity building. Sustainability will derive from this improved capacity, strengthening of national and regional institutions and improvements in policy/legislative frameworks. This project proposal aims to build at the regional level an environment of collaboration and partnership, in which stakeholders at all levels can join hands to address environmental problems of the GCLM. An important outcome of this project proposal is a strategic Action Programme (SAP) to be agreed on at an intergovernmental level. A Transboundary Diagnostic Analysis (TDA) and preliminary Strategic Action Programme (SAP) have been prepared, serving as the basis for preparation of this project proposal and will further elaborated in this project. The SAP shall encompassing targeted and costed action programmes, as well as recommended legal framework for improved regional co-operation in managing marine environmental concerns.
The project is divided into five main components, namely, i) Finalise SAP and develop sustainable financing mechanism for its implementation; ii) Recovery and sustainability of depleted fisheries and living marine resources including mariculture; iii) Planning for biodiversity conservation, restoration of degraded habitats and developing strategies for reducing coastal erosion; iv) Reduce land and sea-based pollution and improve water quality; and v) Regional co-ordination and institutional sustainability. The activities to be undertaken will complement other projects in the

region to provide a strong foundation for the long-term sustainable environmental management of the GCLME.
Comments:

The project design focuses around a development objective that is " to create a regional management framework for sustainable use of living and non-living resources in the GCLME in order to protect and restore the health of the GCLME and its natural resources". The Project Brief Document, with its objectives and outcomes, has 5 components and a total of 37 activities encompassing all elements to effectively assess and manage the resources of the GCLME. The main objective of each component is clearly stated and outcomes clearly identified. The nine demonstration projects designed to be replicable and intended to demonstrate how concrete actions can lead to dramatic improvements. The intended users of the project outcomes are clearly identified, and the direct beneficiaries of the project include government authorities and their affiliated institutions, private sector and NGOs. The ultimate beneficiaries of the project are the populations dependent on the GCLME.

This project is foreseen as being useful in building institutional capacity in the region. The enthusiasm and strong support of the various stakeholders, especially of the Governments themselves, are very much needed in order to foster a regional approach to finding solutions to their common problems. In addition, co-operation among international organisations is foreseen as necessary for the development and co-ordination of the project. Hence, a consortium of entities, both inter- and non-governmental, will be involved in its execution and thus ensuring quality outcomes. The outstanding accomplishments of the Pilot-Phase GEF Gulf of Guinea Large Marine Ecosystem (GOG LME) Project (1995 - 1999), and the history of co-operation between the countries bordering the GCLME under the Abidjan Convention, indicate the existence of important on-going national and regional initiatives and collaboration. Hence, the collaborative actions initiated by this proposal should be able to be sustained once the stakeholders realize the significant benefit from such incremental actions. Finally, the SAP to be elaborated in this proposal is certainly quite comprehensive and effective. Overall, my review concludes that the immediate objectives and the outcomes and activities of the project can be successfully achieved with co-operation among all stakeholders involved.

C1: RESPONSE: NO RESPONSE TO THE STAP REVIEW IS REQUIRED.

ANNEX D

DETAILED LIST OF ACTIVITIES

Component	Sub-Component	Activities
I) Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia) Fill gaps in regional monitoring methods/ standards/etc. By training and at-sea demonstrations for contaminant levels in water, sediments, and biota	i) Develop and implement regional training courses in monitoring methods for coastal and marine pollution (oceanography, chemistry)
		ii) Perform regional at-sea sampling for practical training in acquisition of sediment, water-column, and biota samples for characterization of priority pollutants
	Ib) Identify and fill gaps for the TDA, including biodiversity, socio-economic conditions, legal/regulatory review, stakeholder analysis, hot spots, contaminant levels, etc.	i) Develop work plan for filling gaps based on initial TDA, after reviewing and refining the gaps
		ii) Develop regional working groups to fill gaps
		iii) Acquire new data through targeted field sampling and analysis
	Ic) Update TDA following filling of gaps	i) Establish regional TDA working group
		ii) Using new data from project and other sources, update TDA
		iii) Widely disseminate TDA to stakeholders, governments, and other regional project
	Id) Prepare and endorse National Action Plans	i) Develop training modules for development of national Action Plans
		ii) Implement national and regional training on National Action Plans
		iii) Establish national teams to develop NAPs
		iv) Perform internal consensus-building for NAP through broad stakeholder,intersectoral and Interministerial processes
		v) Obtain national endorsement of NAP at highest level
	Ie) Finalize and endorse regional Strategic Action Programme	i) Develop regional working group for SAP following development of draft NAPs
		ii) Through national and regional workshops, develop consensus on elements of updated SAP
		iii) Finalize SAP
		iv) Obtain endorsement of SAP at highest levels in each country
	If) Hold a donors' conference to mobilize commitments to SAP implementation	i) After SAP is endorsed, organize and host a donors' meeting to mobilize commitments to SAP implementation
		ii) Formalize SAP commitments through appropriate memoranda, agreements, etc., at national or regional level as appropriate
	Ig) Formulate arrangements for sustainable financing of environmental management of the GCLME; Develop and recommend economic	i) Develop consultation process to determine costs for long-term environmental management, who pays, how it is paid, and legal and operational aspects (links with Interim Guinea Current Commission)

Component	Sub-Component	Activities
	instruments and incentives to promote preventive measures to decrease both land and sea-based sources of pollution as well as adequate environmental management in the region	
		ii) Develop linkages with existing institutional arrangements (regional and supra-regional, such as the Abidjan Convention), and international collaborations (such as with IM)
		iii) Identify tools such as conservation easements, land-use zoning, property rights, and other types of incentives to control pollution and encourage the adoption of less polluting technologies
		iv) Identify incentives for private sector participation in monitoring and prevention of pollution
		v) identify and assist in the improved quantification of economic benefits of land-based and maritime pollution prevention, including, for example, reduced insurance costs, protection of tourism assets, fisheries resources, etc.
II) Recovery and sustainability of depleted fisheries and living marine resources, including Mariculture	IIa) Demonstrate regional stock assessment methods including regional surveys (Regional Demonstration Project)	i) Review of existing data and diagnosis of condition of stocks (Question? Devine the stock)
		ii) Develop common methodology for joint regional stock assessment and perform initial joint regional stock assessment.
		iii) Perform demonstration of a Regional Survey, including oceanography, ecological, and introduced species sampling
		iv) Determine a mechanism for an on-going, 1-2 year stock assessment
	IIb) Identify optimal methods and estimates for maximum sustainable yields for dominant commercially important fisheries species	i) Through workshops, identify optimal methods for estimating maximum sustainable yields for dominant fisheries
		ii) Based on demonstration of regional stock assessment, estimate maximum sustainable yields for dominant fisheries
		iii) Through the Guinea Current Fisheries Commission (see Component II, sub-component 4), perform annual or every-two-year estimates of maximum sustainable yields for purposes of setting fisheries quotas on commercial important species in the region
	IIc) Evaluate productivity with regards to its carrying capacity for living marine resources of the ecosystem (Regional Demonstration Project)	i) Perform iterative series of analysis of carrying capacity (productivity assessments and plankton surveys-regional demonstration project). Review existing state-of-knowledge and preliminary carrying capacity analysis (retrospective) and define gaps
		ii) Review existing state-of-knowledge and preliminary carrying capacity analysis (retrospective) and define gaps
	IId) Develop Regional Agreements and Regional Fisheries Commission	i) Develop, and negotiate endorse and ratify regional agreement for sustainable use of fisheries resources.
		ii) Establish a Guinea Current Fisheries Commission and explore mechanism for sustainability

Component	Sub-Component	Activities
	IIe) Assess and draft modifications to the National Legal Frameworks to achieve sustainable fisheries	i) Review existing national laws and regulations on fisheries and Mariculture and pertinent international agreements such as FAO Code of Conducts (various), straddling stocks, WSSD fisheries agreements, etc.
		ii) Draft modifications to national laws and regulations on fisheries
		iii) Facilitate the approval of new or reformed laws and regulation in fisheries
	IIf) Develop Fisheries Management Plans for at least three fisheries	i) Develop and facilitate Regional fisheries management plans, including regional recovery programmes for at least three single or multi-species stock using adaptive approach fisheries
		ii) Through the Guinea Current Fisheries Commission, conduct adaptive management of these fisheries
	IIg) Assess existing coastal aquaculture and Mariculture and determine environmentally sustainable capacity for future development, including identification of investments and legislation for SAP	i) Review existing status, and trends and environmental impact of coastal aquaculture and Mariculture
		ii) Determine maximum practical limits on coastal aquaculture and Mariculture based on analysis of environmental effects of such activities
		iii) At national levels, assure laws and regulations governing coastal aquaculture and Mariculture that reflect best environmental practices.
		iv) Develop guidelines for best environmental practices as they relate to aquaculture and Mariculture. At national levels, assure laws and regulations governing coastal aquaculture and Mariculture reflect the limits developed under this project
III) Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa) Develop Regional Biodiversity Action Plan, including Protected Areas based on Biodiversity Action Plans (National Demonstration Project)	i) Organize a workshop to identify the elements for a regional Biodiversity Action Plan, including National Activity 1. Review existing national practices of coastal habitat use, conservation, and restoration, protected areas, list of rare and endangered species, etc.
		ii) Elaborate a draft regional Biodiversity Action Plan and carry out a broad regional consultation on the proposed regional Biodiversity Action Plan. Using National Biodiversity Action Plans and other sources, identify priority biodiversity areas and issues of regional concern
		iii) Promote the endorsement and implementation of the regional Biodiversity Action Plan. Review existing and proposed protected areas, and develop regional strategy for protected areas
		iv) Review existing and proposed rare and endangered species, and develop regional list of rare and endangered species requiring special protection
		v) Through a participatory process, develop, review and nationally endorse Regional Biodiversity Action Plan
	IIIb) Demonstrate restoration of priority mangrove areas (National Demonstration Project)	i) Identify priority mangrove areas in the region (Nigeria) for restoration, based on ecosystem approach
		ii) Finalize adaptive management and implementation plan for restoration of mangrove areas, including clearing, cleaning, planting, monitoring, and annual review of

Component	Sub-Component	Activities
		restoration approaches
		iii) Monitor, evaluate, and disseminate results of Demonstration Project.
	IIIc) Demonstrate use of Integrated Coastal Area and River Basin Management (ICARM) and assess Physical Alteration and Destruction of Habitat (PADH) for habitat protection (National Demonstration Project)	i) Using ICARM and PADH methodology, finalize approach for demonstration project on Integrated Coastal Management
		ii) Implement demonstration project
		iii) Monitor, evaluate and disseminate results of Demonstration Project
	IIId) Assess status of introduced species and their threats to the biodiversity of the GCLME region; develop legal/regulatory mechanisms for their control	i) Prioritize national and regional risks and threats from introduced species by researching the numbers, ecological niches, and spread of introduced species, as well as their method of introduction (based in part on results of regional survey of Component II)
		ii) Working with IMO and GloBallast, determine extent of introduction of alien species in ballast water, through cooperation with regional task force, communication and public awareness, training, port biota baseline surveys (part of national activities and regional survey in demonstration project of Component I), risk assessment and incorporation into National and Regional Action Plans
	IIIe) Review and update national legislation and draft Perform gap analysis of national legislation, and draft improvements to legislation regarding on key elements of biodiversity identified in the TDA, introduced species, and habitats, etc.	i) Review existing national laws and regulations on biodiversity
		ii) Draft modifications to national laws and regulations on biodiversity
		iii) Facilitate the approval of a new or reformed laws and regulation in biodiversity
		iv) Relying on existing information such as National Environmental Action Plans and other previous documents, determine gaps in laws of each of the 16 GCLME countries, concerning land-based activities, marine-based pollution, introduced species, fisheries, and related areas of concern.
	IIIf) Develop cost-effective mitigation strategies for restoring natural littoral sediment flow/budget for protection of shorelines and critical coastal habitats, including studies, investments for SAP, and legal/regulatory mechanisms (National Demonstration Project)	i) As part of the TDA filling gap, review regional littoral sediment budgets and evaluate changes to sediment budget arising from human activities (damming rivers, interrupting littoral sediment drift, sand mining, etc.)
		ii) Based on priorities of human impacts on littoral sediment budgets, recommend cost-effective mitigation strategies for restoring littoral transport and sand resources (e.g., dredging in reservoirs and restoring sediment to

Component	Sub-Component	Activities
		rivers; redesign and modification of major shoreline structures interrupting littoral transport such as in ports, harbors, breakwaters, etc.; elimination of beach and near-shore sand mining
		iii) Review existing incidences and baseline information on coastal erosion and develop strategies for coastal erosion control (National Demonstration Project: Cote D'Ivoire)
IV) Reduce land and sea-based pollution and improve water quality	IVa) Facilitate development of regionally-integrated and consistent National Programmes of Action for Land-Based Activities, including updating inventories of pollution and habitat hot spots	i) Assess countries in developing realistic and regionally-integrated National Programmes of Action from land-based sources of pollution and activities
		ii) Determine and address training needs in the region for LB sources of pollution and activities and sources
		iii) Develop educational programs at all levels on LB sources of pollution and activities and sources
		iv) Develop Regional/Governmental/Private Sector partnerships on LB activities and sources of pollution
		v) Identify, strengthen, and involve Stakeholders in LBS issues in the Region, including their involvement in Monitoring and Evaluation, as well as development of performance indicators
		vi) Develop and implement a West and Central African regional node of the GPA Clearinghouse Mechanism
	IVb) Develop and implement a Regional Programme of Action for Land-Based Activities	i) Based on Regional Programme of Action, develop a Regional Programme of Action for Land-Based Activities facilitating partnerships between national governments and regional organizations in the private sector and civil society
		ii) Work with governments and stakeholders to obtain broad support for Regional Programme of Action and NPAs
		iii) Promote the Regional Programme of Action and broadly distribute RPA through public awareness campaign
	IVc) Develop a protocol on LBA for the Abidjan Convention	i) Identify, strengthen and involve key stakeholders in preparation and development of protocol through sub-regional and regional stakeholder workshops as well as legal and technical expert meetings
		ii) Review gaps in National regulatory/legislative framework including the review of the status of the appropriate regional/international convention by GCLME participating countries, and assist in developing plans for those that have not yet ratified the Abidjan Convention
		iii) Develop, negotiate, ratify and obtain approval for the Protocol to the Abidjan Convention with Annexes on Land-Based Activities and Sources of Pollution
	IVd) Regional assessment of marine maritime pollution prevention measures, contingency planning, and spill response capabilities	i) Conduct a survey of the existing integrated approach/system for the management of all types of marine wastes in port cities and towns
		ii) Conduct a survey/study on port reception facility requirements and costs in some of the countries
		iii) Review the region's maritime infrastructure with particular regard for survey and inspection requirements as

Component	Sub-Component	Activities
		set out in IMO Conventions
		iv) Assess marine pollution, preparedness and response system for oil spill, and spill-combating equipment needs in each of the countries
		v) Provide advisory services to address specific maritime safety and marine environmental problems on the request of the countries of the region and for the organization and implementation of activities related to *Prevention of Pollution from Shipping Activities-Implementation of MARPOL 73/73; Port State Control (PSC); Marine Pollution Preparedness and Response;* assist with the development/completion of National Contingency Plans.
		vi) Implement training through global/regional/national seminars, workshops, etc., and individual fellowships; provide assistance in developing the national systems for oil spill response (institutional capacity building)
		vii) Assess equipment, facilitating the provision of pollution response equipment, and production and dissemination of training materials, etc.
		viii) Create public awareness regionally on certain aspects of the project activities
	IVe) Development of regional systems for cooperation in cases of major marine pollution incidents (customs, communications, response, liability, and compensation)	i) Evaluate need for and duties of regional emergency response centers
		ii) Develop sub-regional/regional contingency plans and agreement for cooperation
		iii) Develop sub-regional/regional/inter-regional systems for cooperation in cases of major marine pollution incidents
	IVf) Facilitate process to reform legislation in selected countries to adopt and implement international conventions (e.g., MARPOL, OPRC) as related to oil and gas activities	i) Hold high-level meeting of government officials and parliamentarians with IMO and other personnel to discuss conventions related to oil and gas sector, including their benefits and obligations
		ii) If requested, provide technical assistance to countries in translating the provisions of the Conventions into their national legislation
	IVg) Strengthen, improve, and demonstrate methods to reduce nutrient influx to the marine environment (National Demonstration Project)	i) Based on an identified priority nutrient input, conduct demonstration project on controlling nutrient fluxes to the coastal environment
		ii) Monitor, evaluate and broadly disseminate the results of the Demonstration Project throughout the region
	IVh) Develop investment opportunities for the SAP to reduce ecosystem threats identified in the updated TDA	i) Based on demonstration projects, and through broad stakeholder involvement, conduct two regional workshops to develop ideas for investment opportunities for the SAP to reduce ecosystem threats
		ii) Based on priority investments identified through the public participation process, develop at least three of these investments for the SAP process

Component	Sub-Component	Activities
V) Regional coordination and institutional sustainability	Va) Develop a regional project coordination mechanism	i) Staff, equip, and start a Regional Coordination Unit (RCU)
		ii) Develop national project coordination structures in each country, and linkages with the RCU
	Vb) Develop effective Steering Committee	i) Demonstrate value of project to high National Officials to assure continued project support at high levels
		ii) Conduct once or twice-yearly Steering Committee meetings for Governance of Project and Project M&E
		iii) Include broad stakeholder participation in Steering Committee activities to assure project clarity and transparency through providing observer status to civil society and NGOs
	Vc) Establish Intersectoral/ Interministerial/ Ministerial Coordination	i) Determine appropriate national intersectoral, Interministerial, and/or Ministerial coordination requirements to assure broad participation in project
		ii) Establish clear communications procedures nationally and regionally to track, monitor and facilitate project execution
	Vd) Idendify, strengthen and involve stakeholders	i) Develop a public participation and awareness (PPA) workplan for the project
		ii) Implement the PPA workplan involving national experts, private sector, NGOs and other interested parties
		iii) Establish regional information networks and information exchange mechanisms to disseminate information in West and Central Africa through newsletters, a web page, and publications on the progress of the project in order to enhance the replication of successful experiences (within the framework of the Abidjan Convention)
		iv) Integrate private sector involved in GCLME development (industry, shipping, fisheries, tourism) into activities of this project, as appropriate as sub-contractor, consultant or co-sponsor of specific activities
		v) Promote international support and networking for the action program including a mechanism for periodic independent reviews and reporting of results; this should include a role for IMO
		vi) Develop and conduct training workshops for stakeholders
	Ve) Develop Environmental Information System (EIS) for GCLME, including cooperation with other available regional EIS (Regional Demonstration Project)	i) Building n existing institutional arrangement where feasible, establish a Data and Information Management System for the GCLME to facilitate the updating of the TDA and data sharing with other regional projects
		ii) Develop mechanisms for the sharing of data and information for input into the Data and Information Management System for the GCLME
		iii) Create standards and protocols for the collection, processing, analysis and compilation of data and GIS information
		iv) Develop a centralized system for access and distribution of the data to the organizations involved in the GCLME project, as well as other stakeholders
		v) Support all aspects of the GCLME project in their data and information requirements
	Vf) Monitoring and Evaluation (M&E)	i) Perform annual TPR, APR, PIR

Component	Sub-Component	Activities
		ii) Perform mid-term and final evaluations
		iii) Develop GEF IW indicators and monitoring system to evaluate progress on achieving indicators
	Vg) Develop regional coordination mechanism (an Interim Guinea Current Commission, followed by a full-time Commission)	i) Develop regional consensus on the responsibilities, duties, structure, and authorities of a GCC and linkages to the Abidjan Convention and other LME projects (e.g., BCLME)
		ii) Through a regional agreement, formally establish the GCC
		iii) Develop sustainable financing mechanisms for the GCC
	Vh) Provide capacity building for the IGCC	i) Once the responsibilities, duties and authorities of the GCC are established and agreed, develop training modules to enhance capacities of this body
		ii) Facilitate the start-up of the GCC through technical assistance, transfer of equipment and communications facilities

ANNEX F

PUBLIC INVOLVEMENT PLAN SUMMARY

F1. Categories of stakeholders who will be involved in the project include the national and local governments in the participating countries, the private sector, the scientific community, non-government [al] organizations, environmental advocacy groups, local communities, local fishermen (artisanal) and business organizations. The participatory approach is the guiding principle to ensure transparency in the planning execution of project activities. The stakeholders are the direct beneficiaries of the project.

F 2. Within the project, activities for public involvement are included under several components, including under Component Vd. Here several specific subcomponents are directed at stakeholder involvement and public education and outreach, including:

i. Develop a public participation and awareness (PPA) workplan for the project;
ii. Implement the PPA workplan involving national experts, private sector, NGOs and other interested parties;
iii. Establish regional information networks and information exchange mechanisms to disseminate information in West and Central Africa through newsletters, a web page and publications on the progress of the project in order to enhance the replication of successful experiences (within the framework of the Abidjan Convention);
iv. Integrate private sector involved in GCLME development (industry, shipping, fisheries, tourism) into activities of this project, as appropriate as sub-contractor, consultant or co-sponsor of specific activities;
v. Promote international support and networking for the action program including a mechanism for periodic independent reviews and reporting of results; this should include a role for IMO.

Much of these activities will be carried out by regional specialists, although some international experts may be involved. There will be annual reviews by an independent consultant on the progress in implementing the Stakeholder / Public Involvement Plan.

In addition to the Public Involvement anticipated under Component Vd (above), Stakeholder involved is included specifically in the Demonstration Projects, and in other activities, including monitoring and assessment, carrying out project activities, participating in Steering Committee meetings, etc.

The specific involvement of stakeholders throughout the project is given below.

STAKEHOLDER	**INVOLVEMENT**
National governments	Consultation, implementation, [regional] steering committees, international conventions, policy, legislation, investment, capacity building, public-private partnership, institutional reform

STAKEHOLDER	INVOLVEMENT
Local governments	Consultation, implementation, coastal management, capacity building, investment, public-private sector partnerships, national steering committees
Private sector including fishermen, fishing companies, oil and gas sector, shipping, marine transport industry, etc	Consultation, technology and financial investment, public-private partnership, steering committee and management advisory committee membership, participation in SAP process, post-SAP implementation phase
Scientific community	Consultation, research, information technology, risk assessment, monitoring, training
Non-governmental organizations	Consultation, implementation, public awareness, steering committee and management advisory committee membership, training, participation in TDA / SAP process
Community-based organizations, youths and women	Consultation, monitoring, training, community mobilization
Environmental advocacy group	Workshops, training, seminar, public awareness

F3. Since the purpose of the project is to build partnerships, relevant stakeholders will need to be integrated into the project formulation and implementation activities as early as possible. The idea is to identify and develop the role and specific contribution to be made by each interest group within the project framework.

ANNEX G

BASELINE ACTIVITIES AND CO-FINANCING

ANGOLA and BENIN							
Component	**Sub-component**		**Angola**			**Benin**	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods			0			
	Ib. Identify and fill gaps for TDA			0			
	Ic. Update TDA			0			
	Id. Prepare and endorse NAP			0			
	Ie. Finalize and endorse SAP			0			
	If. Hold donors' conference			0			
	Ig. Arrange for sustainable financing	12,500	3,500	16,000			
	Mixed-sub-components						
TOTAL COMPONENT:		**12,500**	**3,500**	**16,000**	**0**	**0**	**0**
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	200,000	75,000	275,000	60,000	30,000	90,000
	IIb. Maximum sustainability yields			0	90,000	20,000	110,000
	IIc. Evaluate productivity			0		20,000	20,000
	IId. Regional Agreements			0			0
	IIe. Draft modifications to NLF	210,000	75,000	285,000			0
	IIf. Fisheries Management Plans	650,000	175,000	825,000	20,000	15,000	35,000
	IIg. Assess for future development	120,000	50,000	170,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**1,180,000**	**375,000**	**1,555,000**	**170,000**	**85,000**	**255,000**

Component	Sub-component		Angola			Benin	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP			0	180,000	20,000	200,000
	IIIb. Restore mangrove areas	175,000	85,000	260,000		15,000	15,000
	IIIc. ICARM & PADH	110,000	50,000	160,000	140,000	35,000	175,000
	IIId. Status of introduced species			0			0
	IIIe. Update national legislation			0			0
	IIIf. Cost-effective strategies	225,000	105,000	330,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**510,000**	**240,000**	**750,000**	**320,000**	**70,000**	**390,000**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action	198,000	73,500	271,500	640,000	215,000	855,000
	IVb. Implement NPA	29,000	9,000	38,000	140,000	40,000	180,000
	IVc. Develop protocol on LBA			0	90,000	60,000	150,000
	IVd. Regional assessment	2,370,600	285,000	2,655,600			0
	IVe. Regional systems	175,000	55,000	230,000			0
	IVf. Reform legislation			0			0
	IVg. Reduce nutrient influx	165,000	55,000	220,000			0
	IVh. SAP investment opportunities			0			0
	Mixed-sub-components						
TOTAL COMPONENT:		**2,937,600**	**477,500**	**3,415,100**	**870,000**	**315,000**	**1,185,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination				150,000	60,000	210,000
	Vb. Effective Steering Committee						0
	Vc. Establish coordination						0
	Vd. Involve stakeholders						0

Component	Sub-component		Angola			Benin	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	Ve. Develop EIS				20,000	20,000	40,000
	Vf. Monitoring & Evaluation						0
	Vg. Interim Current Commission						0
	Vh. Capacity building for IGCC						0
	Mixed-sub-components						
TOTAL COMPONENT:					**170,000**	**80,000**	**250,000**
TOTAL		**4,640,100**	**1,096,000**	**5,736,100**	**1,530,000**	**550,000**	**2,080,000**

CAMEROON and CONGO

Component	Sub-component		Cameroon			Congo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods	250,000	50,000	300,000	700,000	125,000	825,000
	Ib. Identify and fill gaps for TDA	300,000	70,000	370,000	300,000	25,000	325,000
	Ic. Update TDA	25,000	7,500	32,500	330,000	14,000	344,000
	Id. Prepare and endorse NAP	150,000	45,000	195,000	315,000	17,500	332,500
	Ie. Finalize and endorse SAP	25,000	6,000	31,000	300,000	7,500	307,500
	If. Hold donors' conference	10,000	20,000	30,000	10,000	1,000	11,000
	Ig. Arrange for sustainable financing	390,000	90,000	480,000	215,000	7,500	222,500
	Mixed-sub-components						
TOTAL COMPONENT:		**1,150,000**	**288,500**	**1,438,500**	**2,170,000**	**197,500**	**2,367,500**

Component	Sub-component		Cameroon			Congo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	325,000	100,000	425,000	1,250,000	12,000	1,262,000
	IIb. Maximum sustainability yields	400,000	90,000	490,000	453,000	1,000	454,000
	IIc. Evaluate productivity	200,000	40,000	240,000	40,000	350	40,350
	IId. Regional Agreements	75,000	15,000	90,000	0	0	0
	IIe. Draft modifications to NLF	75,000	15,000	90,000	0	0	0
	IIf. Fisheries Management Plans	25,000	5,000	30,000	0	0	0
	IIg. Assess for future development	75,000	15,000	90,000	1,000,000	1,000	1,001,000
	Mixed-sub-components						
TOTAL COMPONENT:		**1,175,000**	**280,000**	**1,455,000**	**2,743,000**	**14,350**	**2,757,350**
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP	75,000	15,000	90,000	800,000	0	800,000
	IIIb. Restore mangrove areas	100,000	20,000	120,000	0	0	0
	IIIc. ICARM & PADH	1,995,000	1,000,000	2,995,000	0	0	0
	IIId. Status of introduced species	75,000	10,000	85,000	5,500	0	5,500
	IIIe. Update national legislation	35,000	7,000	42,000	0	0	0
	IIIf. Cost-effective strategies	350,000	80,000	430,000	0	0	0
	Mixed-sub-components						
TOTAL COMPONENT:		**2,630,000**	**1,132,000**	**3,762,000**	**805,500**	**0**	**805,500**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action	245,000	50,000	295,000			0
	IVb. Implement NPA	55,000	12,000	67,000			0

Component	Sub-component		Cameroon			Congo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	IVc. Develop protocol on LBA	80,000	17,000	97,000			0
	IVf. Reform legislation	20,000	4,000	24,000			0
	IVg. Reduce nutrient influx	55,000	11,000	66,000			0
	IVh. SAP investment opportunities	5,000	1,000	6,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**955,000**	**208,000**	**1,163,000**	**2,000,000**	**0**	**2,000,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination	50,000	10,000	60,000			0
	Vb. Effective Steering Committee	25,000	5,000	30,000			0
	Vc. Establish coordination	15,000	3,000	18,000			0
	Vd. Involve stakeholders	40,000	7,000	47,000			0
	Ve. Develop EIS	70,000	14,000	84,000			0
	Vf. Monitoring & Evaluation	15,000	3,000	18,000			0
	Vg. Interim Current Commission						0
	Vh. Capacity building for IGCC	75,000	15,000	90,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**290,000**	**57,000**	**347,000**	**0**	**0**	**0**
TOTAL		**6,200,000**	**1,965,500**	**8,165,500**	**7,718,500**	**211,850**	**7,930,350**

COTE d'IVOIRE and DEMOCRATIC REPUBLIC OF CONGO

Component	Sub-component		Cote d'Ivoire			Democratic Republic of Congo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods	140,000	20,000	160,000	266,000	17,000	283,000
	Ib. Identify and fill gaps for TDA	180,000	35,000	215,000	110,000	15,000	125,000
	Ic. Update TDA	55,000	2,000	57,000			0
	Id. Prepare and endorse NAP	90,000	35,000	125,000	100,000	10,000	110,000
	Ie. Finalize and endorse SAP	31,000	7,000	38,000			0
	If. Hold donors' conference	15,000		15,000	20,000	5,000	25,000
	Ig. Arrange for sustainable financing	110,000	27,000	137,000		5,000	5,000
	Mixed-sub-components						
TOTAL COMPONENT:		**621,000**	**126,000**	**747,000**	**496,000**	**52,000**	**548,000**
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	390,000	125,000	515,000			0
	IIb. Maximum sustainability yields	210,000	40,000	250,000	150,000	15,000	165,000
	IIc. Evaluate productivity	320,000	35,000	355,000			0
	IId. Regional Agreements	40,000	7,000	47,000	10,000	2,000	12,000
	IIe. Draft modifications to NLF	45,000	9,000	54,000	30,000	10,000	40,000
	IIf. Fisheries Management Plans	20,000	3,000	23,000	50,000	5,000	55,000
	IIg. Assess for future development	55,000	8,000	63,000	200,000	50,000	250,000

Component	Sub-component		Cote d'Ivoire			Democratic Republic of Congo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	Mixed-sub-components						
TOTAL COMPONENT:		**1,080,000**	**227,000**	**1,307,000**	**440,000**	**82,000**	**522,000**
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP	70,000	9,000	79,000			0
	IIIb. Restore mangrove areas	100,000	15,000	115,000			0
	IIIc. ICARM & PADH	700,000	180,000	880,000			0
	IIId. Status of introduced species	40,000	7,000	47,000	150,000	10,000	160,000
	IIIe. Update national legislation	25,000	6,000	31,000	395,000	20,000	415,000
	IIIf. Cost-effective strategies	1,055,687	135,000	1,190,687			0
	Mixed-sub-components						
TOTAL COMPONENT:		**1,990,687**	**352,000**	**2,342,687**	**545,000**	**30,000**	**575,000**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action	190,000	33,000	223,000	50,000	2,000	52,000
	IVb. Implement NPA	40,000	6,000	46,000			0
	IVc. Develop protocol on LBA	52,000	13,000	65,000	50,000	5,000	55,000
	IVd. Regional assessment	725,000	117,000	842,000			0
	IVe. Regional systems	45,000	8,000	53,000			0
	IVf. Reform legislation	45,000	10,000	55,000			0
	IVg. Reduce nutrient influx	115,000	18,000	133,000			0

Component	Sub-component		Cote d'Ivoire			Democratic Republic of Congo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	IVh. SAP investment opportunities	20,000	2,000	22,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**1,232,000**	**207,000**	**1,439,000**	**100,000**	**7,000**	**107,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination	75,000	10,000	85,000		1,000	1,000
	Vb. Effective Steering Committee	30,000	6,000	36,000		1,500	1,500
	Vc. Establish coordination	25,000	6,000	31,000	5,000	1,000	6,000
	Vd. Involve stakeholders	40,000	5,500	45,500	200,000	10,000	210,000
	Ve. Develop EIS	38,000	7,000	45,000			0
	Vf. Monitoring & Evaluation	15,000	1,000	16,000			0
	Vg. Interim Current Commission			0			0
	Vh. Capacity building for IGCC	100,000	17,000	117,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**323,000**	**52,500**	**375,500**	**205,000**	**13,500**	**218,500**
TOTAL		**5,246,687**	**964,500**	**6,211,187**	**1,786,000**	**184,500**	**1,970,500**

GABON and GHANA							
Component	**Sub-component**		**Gabon**			**Ghana**	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods	200,000	70,000	270,000			0
	Ib. Identify and fill gaps for TDA	180,000	39,000	219,000			0
	Ic. Update TDA	80,000	35,000	115,000			0
	Id. Prepare and endorse NAP	110,000	7,000	117,000			0
	Ie. Finalize and endorse SAP	90,000	4,000	94,000			0
	If. Hold donors' conference	10,000	2,000	12,000			0
	Ig. Arrange for sustainable financing	20,000	4,000	24,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**690,000**	**161,000**	**851,000**	**0**	**0**	**0**
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	204,000	21,000	225,000			0
	IIb. Maximum sustainability yields	40,000	8,000	48,000			0
	IIc. Evaluate productivity	50,000	5,000	55,000			0
	IId. Regional Agreements	10,000	1,000	11,000			0
	IIe. Draft modifications to NLF			0			0
	IIf. Fisheries Management Plans			0			0
	IIg. Assess for future development	40,000	12,000	52,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**344,000**	**47,000**	**391,000**	**0**	**0**	**0**

Component	Sub-component		Gabon			Ghana	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP	45,000	8,000	53,000			0
	IIIb. Restore mangrove areas	35,000	6,000	41,000			0
	IIIc. ICARM & PADH	137,000	41,000	178,000			0
	IIId. Status of introduced species	5,000	1,000	6,000			0
	IIIe. Update national legislation			0			0
	IIIf. Cost-effective strategies	11,000	3,000	14,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**233,000**	**59,000**	**292,000**	**0**	**0**	**0**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action	55,000	13,000	68,000	110,000	30,000	140,000
	IVb. Implement NPA	50,000	10,000	60,000			0
	IVc. Develop protocol on LBA	20,000	4,500	24,500			0
	IVd. Regional assessment	87,500	12,000	99,500	5,960,000	5,590,000	11,550,000
	IVe. Regional systems	20,000	6,000	26,000			0
	IVf. Reform legislation	12,000	3,000	15,000			0
	IVg. Reduce nutrient influx	65,000	10,000	75,000	110,000	30,000	140,000
	IVh. SAP investment opportunities	10,000	2,000	12,000	400,000	150,000	550,000
	Mixed-sub-components						
TOTAL COMPONENT:		**319,500**	**60,500**	**380,000**	**6,580,000**	**5,800,000**	**12,380,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination	60,000	7,000	67,000			0

Component	Sub-component		Gabon			Ghana	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	Vb. Effective Steering Committee	1,000	500	1,500			0
	Vc. Establish coordination	5,000	1,000	6,000			0
	Vd. Involve stakeholders	17,500	4,500	22,000			0
	Ve. Develop EIS	38,000	8,500	46,500	346,000	60,000	406,000
	Vf. Monitoring & Evaluation			0			0
	Vg. Interim Current Commission	15,000	3,000	18,000			0
	Vh. Capacity building for IGCC	63,000	10,000	73,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**199,500**	**34,500**	**234,000**	**346,000**	**60,000**	**406,000**
TOTAL		**1,786,000**	**362,000**	**2,148,000**	**6,926,000**	**5,860,000**	**12,786,000**

GUINEA and GUINEA BISSAU

Component	Sub-component		Guinea			Guinea Bissau	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods			0	250,000	50,000	300,000
	Ib. Identify and fill gaps for TDA			0	250,000	50,000	300,000
	Ic. Update TDA			0	220,000	44,000	264,000
	Id. Prepare and endorse NAP			0	123,000	48,000	171,000
	Ie. Finalize and endorse SAP			0	230,000	51,500	281,500
	If. Hold donors' conference			0	230,000	56,000	286,000
				0	255,000	51,000	306,000

Component	Sub-component		Guinea			Guinea Bissau	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	Ig. Arrange for sustainable financing						
	Mixed sub-components						
TOTAL COMPONENT:		**0**	**0**	**0**	**1,558,000**	**350,500**	**1,908,500**
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	900,000	1,900,000	2,800,000	520,000	137,500	657,500
	IIb. Maximum sustainability yields	15,000	15,000	30,000	450,000	105,000	555,000
	IIc. Evaluate productivity	660,000	65,000	725,000	480,000	111,500	591,500
	IId. Regional Agreements			0	110,000	22,000	132,000
	IIe. Draft modifications to NLF	350,000	35,000	385,000	90,000	18,000	108,000
	IIg. Assess for future development	150,000	15,000	165,000	220,000	44,000	264,000
	Mixed-sub-components						
TOTAL COMPONENT:		**2,275,000**	**2,050,000**	**4,325,000**	**2,070,000**	**508,000**	**2,578,000**
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP	150,000	15,000	165,000	340,000	68,000	408,000
	IIIb. Restore mangrove areas	250,000	25,000	275,000	170,000	44,000	214,000
	IIIc. ICARM & PADH	70,000	10,000	80,000	195,000	39,000	234,000
	IIId. Status of introduced species			0	210,000	49,500	259,500
	IIIe. Update national legislation	150,000	15,000	165,000	95,000	41,000	136,000
	IIIf. Cost-effective strategies	230,000	25,000	255,000	490,000	117,500	607,500
	Mixed-sub-components						
TOTAL COMPONENT:		**850,000**	**90,000**	**940,000**	**1,500,000**	**359,000**	**1,859,000**

Component	Sub-component		Guinea			Guinea Bissau	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action	1,565,000	161,000	1,726,000	560,000	112,000	672,000
	IVb. Implement NPA	250,000	60,000	310,000	290,000	66,500	356,500
	IVc. Develop protocol on LBA	145,000	25,000	170,000	195,000	59,000	254,000
	IVd. Regional assessment	315,000	105,000	420,000	620,000	131,500	751,500
	IVe. Regional systems			0	170,000	34,000	204,000
	IVf. Reform legislation			0	90,000	18,000	108,000
	IVg. Reduce nutrient influx	300,000	60,000	360,000	160,000	32,000	192,000
	IVh. SAP investment opportunities				100,000	20,000	120,000
	Mixed-sub-components						
TOTAL COMPONENT:		**2,575,000**	**411,000**	**2,986,000**	**2,185,000**	**473,000**	**2,658,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination	1,100,000	60,000	1,160,000	600,000	120,000	720,000
	Vb. Effective Steering Committee			0	285,000	57,000	342,000
	Vc. Establish coordination			0	150,000	30,000	180,000
	Vd. Involve stakeholders			0	445,000	89,000	534,000
	Ve. Develop EIS	70,000	15,000	85,000	265,000	53,000	318,000
	Vf. Monitoring & Evaluation			0	370,000	74,000	444,000
	Vg. Interim Current Commission			0	120,000	22,000	142,000
	Vh. Capacity building for IGCC			0	350,000	70,000	420,000
	Mixed-sub-components						
TOTAL COMPONENT:		**1,170,000**	**75,000**	**1,245,000**	**2,585,000**	**515,000**	**3,100,000**
TOTAL		**6,870,000**	**2,626,000**	**9,496,000**	**9,898,000**	**2,205,500**	**12,103,500**

EQUATORIAL GUINEA and LIBERIA

Component	Sub-component		Equatorial Guinea			Liberia	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods						
	Ib. Identify and fill gaps for TDA						
	Ic. Update TDA						
	Id. Prepare and endorse NAP						
	Ie. Finalize and endorse SAP						
	If. Hold donors' conference						
	Ig. Arrange for sustainable financing						
	Mixed-sub-components						
TOTAL COMPONENT:					**0**	**0**	**0**
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data				7,066	10,032	17,098
	IIb. Maximum sustainability yields					5,500	5,500
	IIc. Evaluate productivity				8,635	4,350	12,985
	IId. Regional Agreements						0
	IIe. Draft modifications to NLF				4,200	6,500	10,700
	IIf. Fisheries Management Plans						0
	IIg. Assess for future development				3,150	3,800	6,950
TOTAL COMPONENT:					**23,051**	**30,182**	**53,233**

Component	Sub-component		Equatorial Guinea			Liberia	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP						0
	IIIb. Restore mangrove areas				4,800	5,000	9,800
	IIIc. ICARM & PADH						0
	IIId. Status of introduced species				5,500	3,500	9,000
	IIIe. Update national legislation						0
	IIIf. Cost-effective strategies				14,250	15,900	30,150
	Mixed-sub-components						
TOTAL COMPONENT:					**24,550**	**24,400**	**48,950**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action				21,750	54,785	76,535
	IVb. Implement NPA				10,447	14,050	24,497
	IVc. Develop protocol on LBA				14,780	9,390	24,170
	IVd. Regional assessment				29,030	14,470	43,500
	IVe. Regional systems						0
	IVf. Reform legislation				9,510	5,280	14,790
	IVg. Reduce nutrient influx				5,995	7,635	13,630
	IVh. SAP investment opportunities						0
	Mixed-sub-components						
TOTAL COMPONENT:					**91,512**	**105,610**	**197,122**

Component	Sub-component		Equatorial Guinea			Liberia	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
V. Regional coordination and institutional sustainability	Va. Regional project coordination				4,700	3,900	8,600
	Vb. Effective Steering Committee						0
	Vc. Establish coordination						0
	Vd. Involve stakeholders						0
	Ve. Develop EIS						0
	Vf. Monitoring & Evaluation						0
	Vg. Interim Current Commission						0
	Vh. Capacity building for IGCC						0
	Mixed-sub-components						
TOTAL COMPONENT:					**4,700**	**3,900**	**8,600**
TOTAL COMPONENT:					**143,813**	**164,092**	**307,905**
TOTAL			**495,000**				
NIGERIA and SAO TOME AND PRINCIPE							
Component	**Sub-component**		**Nigeria**			**Sao Tome and Principe**	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods			0			
	Ib. Identify and fill gaps for TDA			0			
	Ic. Update TDA			0			

	Id. Prepare and endorse NAP			0			
Component	**Sub-component**		**Nigeria**			**Sao Tome and Principe**	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	Ie. Finalize and endorse SAP			0			
	If. Hold donors' conference			0			
	Ig. Arrange for sustainable financing			0			
	Mixed-sub-components						
TOTAL COMPONENT:		**0**	**0**	**0**	**0**	**0**	**0**
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	650,000	100,000	750,000	500,000	100,000	600,000
	IIb. Maximum sustainability yields			0			0
	IIc. Evaluate productivity			0	100,000	20,000	120,000
	IId. Regional Agreements			0			0
	IIe. Draft modifications to NLF			0	200,000	40,000	240,000
	IIf. Fisheries Management Plans			0			0
	IIg. Assess for future development			0	200,000	40,000	240,000
	Mixed-sub-components						
TOTAL COMPONENT:		**650,000**	**100,000**	**750,000**	**1,000,000**	**200,000**	**1,200,000**
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP	7,000,000	500,000	7,500,000			0
	IIIb. Restore mangrove areas	15,000,000	1,000,000	16,000,000			0
	IIIc. ICARM & PADH	15,500,000	1,510,000	17,010,000			0

	IIId. Status of introduced species	55,000,000	750,000	55,750,000			0
Component	**Sub-component**		**Nigeria**			**Sao Tome and Principe**	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	IIIe. Update national legislation			0			0
	IIIf. Cost-effective strategies	450,000,000	3,750,000	453,750,000	200,000	40,000	240,000
	Mixed-sub-components						
TOTAL COMPONENT:		**542,500,000**	**7,510,000**	**550,010,000**	**200,000**	**40,000**	**240,000**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action	150,000,000	3,000,000	153,000,000	175,000	54,000	229,000
	IVb. Implement NPA			0	70,000	15,000	85,000
	IVc. Develop protocol on LBA			0	110,000	19,000	129,000
	IVd. Regional assessment	50,000,000	500,000	50,500,000	290,000	68,000	358,000
	IVe. Regional systems			0			0
	IVf. Reform legislation			0			0
	IVg. Reduce nutrient influx			0			0
	IVh. SAP investment opportunities			0			0
	Mixed-sub-components						
TOTAL COMPONENT:		**200,000,000**	**3,500,000**	**203,500,000**	**645,000**	**156,000**	**801,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination	550,000	100,000	650,000	80,000	50,000	130,000
	Vb. Effective Steering Committee			0			0
	Vc. Establish coordination			0	100,000	50,000	150,000
	Vd. Involve stakeholders			0			0

	Ve. Develop EIS			0			0
	Vf. Monitoring & Evaluation			0			0

Component	Sub-component		Nigeria			Sao Tome and Principe	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	Vg. Interim Current Commission			0			0
	Vh. Capacity building for IGCC			0			0
	Mixed-sub-components						
TOTAL COMPONENT:		**550,000**	**100,000**	**650,000**	**180,000**	**100,000**	**280,000**
TOTAL		**743,700,000**	**11,210,000**	**754,910,000**	**2,025,000**	**496,000**	**2,521,000**

SIERRA LEONE and TOGO

Component	Sub-component		Sierra Leone			Togo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
I. Finalize SAP and develop sustainable financing mechanisms for its implementation	Ia. Fill gaps in monitoring methods	27,000	8,000	35,000	25,000	9,000	34,000
	Ib. Identify and fill gaps for TDA	9,500	5,500	15,000	20,000	8,000	28,000
	Ic. Update TDA	20,000	9,000	29,000			0
	Id. Prepare and endorse NAP	38,500	16,000	54,500	49,000	17,000	66,000
	Ie. Finalize and endorse SAP	51,500	30,500	82,000	30,000	10,000	40,000
	If. Hold donors' conference	15,000	7,500	22,500	3,000	2,000	5,000
	Ig. Arrange for sustainable financing	50,000	90,000	140,000	40,000	17,000	57,000
	Mixed-sub-components						
TOTAL COMPONENT:		**211,500**	**166,500**	**378,000**	**167,000**	**63,000**	**230,000**

Component	Sub-component		Sierra Leone			Togo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
II. Recovery and sustainability of depleted fisheries and living marine resources including Mariculture	IIa. Review existing data	32,000	17,000	49,000	10,000	4,000	14,000
	IIb. Maximum sustainability yields	8,000	4,500	12,500	218,000	28,000	246,000
	IIc. Evaluate productivity	25,000	15,000	40,000	45,000	18,000	63,000
	IId. Regional Agreements	7,500	4,500	12,000	10,000	5,000	15,000
	IIe. Draft modifications to NLF	19,000	9,500	28,500	10,000	5,000	15,000
	IIf. Fisheries Management Plans		1,100,000	1,100,000	10,000	4,000	14,000
	IIg. Assess for future development	34,000	16,500	50,500	20,000	6,000	26,000
	Mixed-sub-components						
TOTAL COMPONENT:		**125,500**	**1,167,000**	**1,292,500**	**323,000**	**70,000**	**393,000**
III. Planning for biodiversity conservation, restoration of degraded habitats and development of strategies for reducing coastal erosion	IIIa. Develop RBAP	5,500	22,500	28,000	15,000	5,000	20,000
	IIIb. Restore mangrove areas	13,000	8,000	21,000	30,000	14,000	44,000
	IIIc. ICARM & PADH			0			0
	IIId. Status of introduced species	5,500	14,000	19,500	35,000	7,000	42,000
	IIIe. Update national legislation	6,500	4,000	10,500	10,000	3,000	13,000
	IIIf. Cost-effective strategies	10,000	5,500	15,500	27,000	5,500	32,500
	Mixed-sub-components						
TOTAL COMPONENT:		**40,500**	**54,000**	**94,500**	**117,000**	**34,500**	**151,500**
IV. Reduce land and sea-based pollution and improve water quality	IVa. National Programmes of Action		4,000	4,000	75,000	29,000	104,000
	IVb. Implement NPA		4,000	4,000	40,000	20,000	60,000

Component	Sub-component		Sierra Leone			Togo	
		Baseline	***Co-Financing***	***Total***	***Baseline***	***Co-Financing***	***Total***
	IVc. Develop protocol on LBA	8,500	4,000	12,500	30,000	13,000	43,000
	IVd. Regional assessment	10,000	5,500	15,500	90,000	34,000	124,000
	IVe. Regional systems	5,500	3,500	9,000			0
	IVf. Reform legislation			0	17,000	4,000	21,000
	IVg. Reduce nutrient influx	3,500	2,500	6,000			0
	IVh. SAP investment opportunities	3,000	2,000	5,000			0
	Mixed-sub-components						
TOTAL COMPONENT:		**30,500**	**25,500**	**56,000**	**252,000**	**100,000**	**352,000**
V. Regional coordination and institutional sustainability	Va. Regional project coordination	5,500	4,000	9,500	50,000	208,000	258,000
	Vb. Effective Steering Committee	5,500	3,000	8,500	15,000	6,000	21,000
	Vc. Establish coordination	13,500	5,500	19,000		2,000	2,000
	Vd. Involve stakeholders	8,500	4,000	12,500	45,000	15,000	60,000
	Ve. Develop EIS	15,000	4,500	19,500	31,000	12,000	43,000
	Vf. Monitoring & Evaluation			0	30,000	12,000	42,000
	Vg. Interim Current Commission	15,000	4,500	19,500			0
	Vh. Capacity building for IGCC	15,000	4,500	19,500			0
	Mixed-sub-components						
TOTAL COMPONENT:		**78,000**	**30,000**	**108,000**	**171,000**	**255,000**	**426,000**
TOTAL		**486,000**	**1,443,000**	**1,929,000**	**1,030,000**	**522,500**	**1,552,500**

ANNEX H

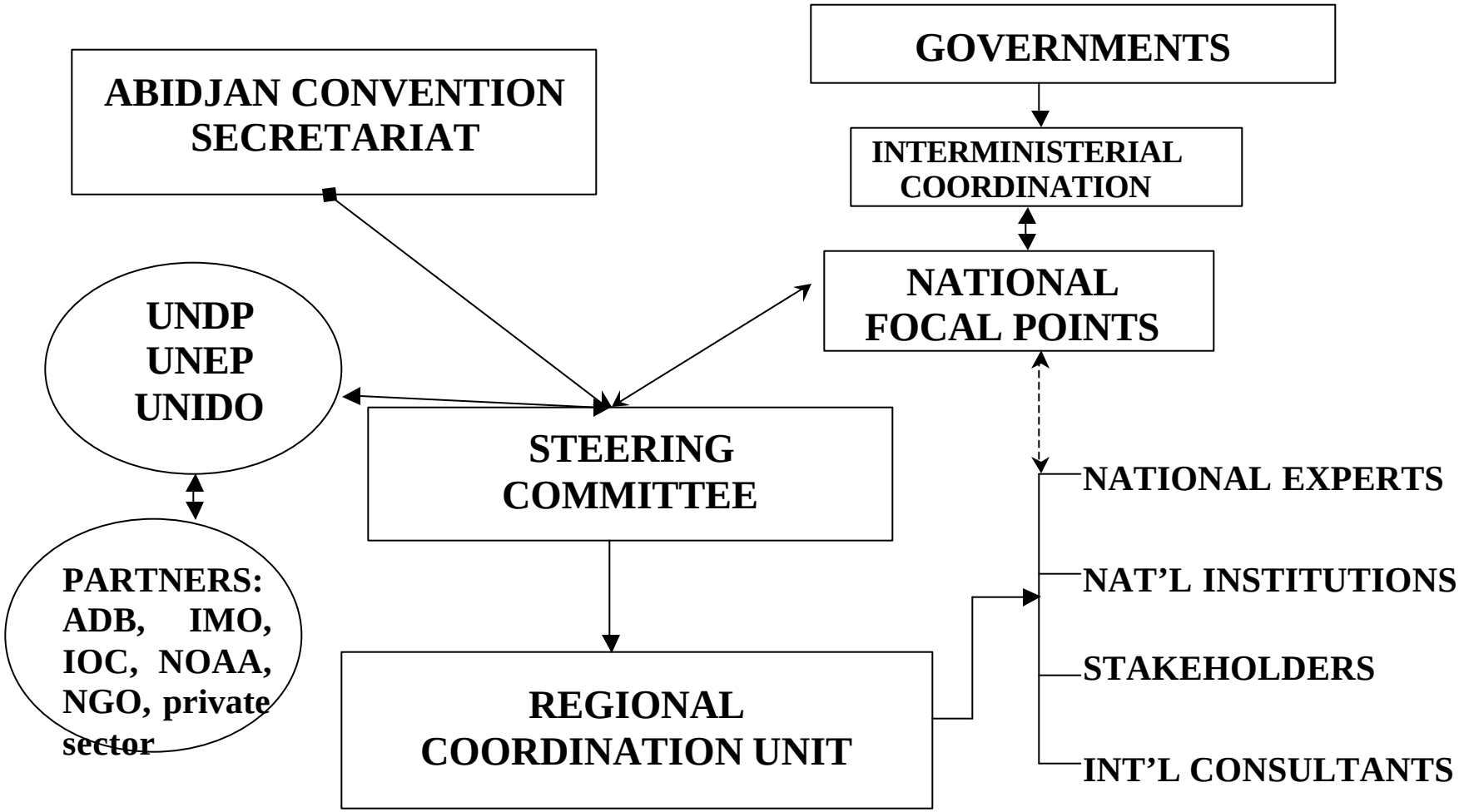
PUBLICATIONS ON THE GUINEA CURRENT LARGE MARINE ECOSYSTEM USED FOR THE TDA AND PROJECT BRIEF PREPARATION

-
- Perspectives in Integrated Coastal Areas Management in the Gulf of Guinea, UNIDO/UNDP/GEF. CEDA, 1998 (91pp).
- The State of the Coastal and Marine Environment of the Gulf of Guinea, CEDA, 1999 (160pp)
- Integrated Environmental and Living Resources Management in the Gulf of Guinea. Proceedings of the First Regional Symposium for the Gulf of Guinea Large Marine Ecosystem, January 1998 (approx 300pp)
- Nearshore Dynamics and Sedimentology of the Gulf of Guinea, UNIDO/UNDP/GEF/IOC-UNESCO. CEDA 1998 (211pp).
- State of the marine environment: West and Central Africa Region: UNEP Regional Seas Report and Studies No. 108, UNEP 1989 (34pp).
- National Reports of the countries represented at the PDF B/1 Regional Stakeholders Workshop in Accra, Ghana, 14-18 May 2001.
- Regional Synthesis Report on the PDF B/1 Regional Stakeholders Workshop, UNEP/UNIDO/UNDP/GEF Report, Accra, Ghana, 14-18 May 2001.
- Sectoral/Thematic Reports in Eleven areas prepared by regional experts for the PDF B/1 Regional Stakeholders Workshop, Accra, Ghana, 14-18 May 2001.
- Report of the First Working Group Workshop of the GCLME PDF B/1, Accra, Ghana 14-15 May 2001.
- Report of the First Stocktaking Workshop of the GCLME PDF B/1, Accra, Ghana 16-17 May 2001.
- Report of the First Steering Committee Meeting of the GCLME PDF B/1, Accra, Ghana 14-16 May 2001.
- Overview of Land-Based Sources and Activities affecting the Marine, Coastal and associated Freshwater Environment in the West and Central African Region, UNEP 1999 (111pp).
- The Gulf of Guinea Large Marine Ecosystem, Environmental Forcing and Sustainable Development of Marine Resources, Elsevier 2002 (392pp).
- Integrated Water Pollution Assessment in Data- and Resource- Poor Situations: Lake Victoria and the Gulf of Guinea Case Studies. P.A.G.M, Scheren (2003), Eindhoven: Teschnische Universiteit Eindhoven, 2003 (216pp).
- Benin Coastal Profile, MEHU/UNIDO/UNDP/GEF, 1998. CEDA, Cotonou (93pp).

- Cameroon Coastal Profile, MINEF/UNIDO/UNDP/GEF, 1999. CEDA, Cotonou (102pp).
- Cote d'Ivoire Coastal Profile, MLCVE-CI/UNIDO/UNDP/GEF, 1998. CEDA, Cotonou (87pp).
- Ghana Coastal Profile, MEST/UNIDO/UNDP/GEF, 1998. Royal Crown Press, Accra (111pp).
- Nigeria Coastal Profile, FEPA/UNIDO/UNDP/GEF, 1998. CEDA, Cotonou (93pp).
- Togo Coastal Profile, MERF/UNIDO/UNDP/GEF, 1999. Presses de l'Universite de Benin, Lome (80pp).
- Developing countries and the Restoration of Large Marine Ecosystems: Industrial Globalized Fisheries and the North-South Divide. Report prepared by UNIDO for the World Summit on Sustainable Development, Johannesburg 2002 (12pp).

ANNEX I

PROJECT INSTITUTIONAL ARRANGEMENTS
GCLME



ANNEX J

COPIES OF GEF OPERATIONAL FOCAL POINT ENDORSEMENT LETTERS
(Separate Document)

ANNEX K

SUMMARY OF FINAL REVIEW OF PILOT PHASE GCLME

This report presents the FINAL IN-DEPTH EVALUATION of the Project "Water Pollution Control and Biodiversity Conservation In the Gulf of Guinea Large Marine Ecosystem (LME)"; EG/RAF/92/G34", funded by GEF through the UNDP "Implementing Agency" and executed by UNIDO with the technical co-operation of NOAA and UNEP. The purpose of this In-Depth Evaluation is to enable the Government bodies, UNDP, UNIDO and UNEP and the donor to assess progress and to take decisions on the future orientation and emphasis.

Participating countries in the project were Benin, Cameroon, Côte d'Ivoire, Ghana, Nigeria and Togo. The evaluation was conducted during November - December 1999.

The In-Depth Evaluation Report follows assessment of project conceptual design, implementation and results followed by conclusions, recommendations and lessons learned.

The project design focuses around a development objective that is "to protect and restore the health of the Gulf of Guinea Large Marine Ecosystem and its natural resources" and bears directly on the relationship between industrial and coastal development activities and the environment.

The Project Document of 1994, with its immediate objectives and outputs, had 85 activities encompassing all elements to effectively assess and manage the resources of the Gulf of Guinea Large Marine Ecosystem The majority of these Outputs are not only Gulf of Guinea specific but they are specific to the holistic Large Marine Ecosystem approach, and its drainage basins, which can be applied to any tropical or sub tropical developing region of the world. The main objectives were clearly stated and outputs clearly identified. In some cases objectives were achievable but others were more difficult to achieve. Excellent progress has been made in many of the outputs but a few were far too ambitious for a four years project with a limited budget We have endeavoured to make clear in the text of this Final Evaluation which of the outputs were achieved, which were not, and the reasons pertinent to the extent of successful implementation or lack of same.

We have also endeavoured to assess the outputs of this Project with more realism and commented on the success and problems, having observed and understood the limitations within the Region.

Overall, our assessment concludes that many of the immediate objectives and many of the outputs and activities have been successfully achieved, and in some cases the expected outputs have been surpassed, e.g. publication of country coastal profiles and draft Integrated Coastal Areas Management Plans. Our general conclusion is that the many positive accomplishments of the project are particularly encouraging when assessed in the context of pre-project conditions in the individual countries of the project and the project region generally.

We have also concluded that changes of Governments, Ministers, National Programrne Project Directors and Assistants have caused many problems for the project. These changes, more serious in some countries than in others, could have had disruptive impacts on the Project but for the stabilising efforts of the Regional Co-ordination Centre. Stability in the staffing of such a project as the GOG LME is a fundamental condition for success and should be nurtured in any subsequent phases of this and similar GEF projects.

Co-operation among international organizations was foreseen as necessary for the development and co-ordination of the project. This was achieved at the level of Regional Co-ordination.

On the national level the co-operation could have been stronger between UN agencies in some of the countries visited more specifically, Cameroon and Togo. In Ghana, strong co-operation was observed and could be taken as a template for good and close co-operation within this project. Other international organizations (either UN or other agencies) co-operated on bilateral or multilateral levels with the project. It is suggested that co-operation among sectors, including the non-government and private sectors, needs further strengthening and enhancement.

The project was successful in building institutional capacity in the region (see Annex 10). Reasons for success include the enthusiasm and strong support of the various stakeholders, especially of the Governments themselves, which have demonstrated strong political will to foster a regional approach to finding solutions to their common problems e.g. overfishing, coastal erosion, oil and chemical spills. Secondly, 416 scientists, managers and supervisors from Government regulatory agencies, as well as numerous representatives of NGOs participated in 35 regional training activities, besides 426 participants attending National ICAM Workshops.

The project had clear impacts on the policy and strategies of the countries; this was reflected in the development of management-oriented actions in most of the countries, such as the Integrated Coastal Area Management National Action Plans.

The intended users of the project outputs were clearly identified, and the direct

beneficiaries of the project included government authorities and their affiliated institutions, private sector and NGOs. The ultimate beneficiary of the project are the populations dependent on the Gulf of Guinea Large Marine Ecosystem Thus capacity building was an important focus of the project since the first immediate objective of this project was ' Strengthening regional institutional capacities to prevent and remedy pollution of the Gulf of Guinea LME and associated degradation of critical habitats".

Our review has determined that the level of commitment to the project demonstrated by the responsible governments and/or non-government national institutions has been one of the biggest successes of the GOG LME, together with the involvement of the GOG LME NGO Network. There was complete support expressed from all the Government Ministries involved at the First Meeting of the Committee of Ministers in Accra (Ghana) in July 1998, and this support has continued throughout the project timeframe and was repeatedly expressed during our interviews as part of this evaluation.

The Ministerial Committee has adopted the Accra Declaration as an expression of common political will for the environmentally sustainable development of marine and coastal areas of the Gulf of Guinea, and furthermore has called for the development of a Strategic Action Plan (SAP) including a full Trans-Boundary Diagnostic Analysis (TDA), leading to an expanded second phase to include all the 16 countries between Guinea Bissau in the north to Angola in the south, which are influenced fully or partly by the Guinea Current LME. A letter signed from the Ministers was addressed to the UNDP which strongly reflects the above, and called for the speedy approval of the submitted PDF Block B Proposal for the development of a SAP/TDA for the Gulf of Guinea LME. The Governments and Institutions agreed to provide local facilities administrative and other support services to ensure effective implementation of the specific activities, although this was more forthcoming in some countries than in others. Based upon our assessment this level of support continues to be expressed by the participating countries.

There were notable funding gaps in the project, which allowed only token funding to be made in most of the project activities, particularly in GIS, pollution and living resources monitoring programme and the participation of NGOs (see for e.g. Boxes 2 and 3). Funds allocated to these activities did not correspond to country expectations, a discrepancy in part corrected by funds from the six countries, co-operating UN and non-UN agencies and the private sector. This example of co-finance secured during project implementation displayed not only country commitment but provided an indication that the project commanded the confidence of other donors. Based upon our review, this level of country commitment and donor participation is likely to continue should there be a phase 2.

The Regional Co-ordination Centre (RCC), Abidjan, served to enhance regional co-operation and co-ordination as well as achieving cohesion between the various inputs, including training of personnel, outlined in the project document or modifications thereof. The Regional Coordination Centre (RCC) / Project Steering Committee managed the project efficiently, especially considering that the RCC was, in our judgment, under-staffed. UNIDO was aware of some of these shortcomings and contributed by placing extra manpower from its own resources in the RCC, thus increasing the level of co-

finance from the Executing Agency.

Co-operation among sectors in the areas of environmental management and protection, including the non-government and private sectors, has been facilitated by the project. Nevertheless, our review concludes that the level of co-operation needs further strengthening and enhancement because of its importance to the sustainability of a project of this magnitude.

In addition to progress that resulted from project activities, additional positive effects have occurred during project implementation, particularly in areas of enhancement of national and regional capabilities (Training) and areas of environmental management such as Marine Debris and Waste Management.

Procedures for Monitoring and Assessment of project progress have included periodic meetings of the governing bodies of the project, and through the use of independent consultants to assess project performance and impacts. Results of these evaluations and assessments are available upon request from the Executing Agency of the project, the UNIDO.

The sustainability of project outcomes for the immediate future will largely depend on funding made available from funding agencies and/or donors, since the participating countries do not appear to have sufficient finances to sustain many of the activities begun by the project.

The participating countries have made it clear to the reviewers that they wish the GEF to consider positively a second phase of the project "Water Pollution Control and Biodiversity Conservation in the Guy of Guinea Large Marine Ecosystem (LME)", based on the progress made in the project, on the strong national political and community will, on the recommendation of the Second and Third Project Steering Committee meeting (Cotonou, 1112 March 1997, 8 July 1998) and the decision of the Interagency Meeting between UNDP GEF and UNIDO (Vienna, 8-9 September 1997). This Meeting concluded that a proposal would be developed for the preparation of a Strategic Action Plan (SAP), including a Transboundary Diagnostic Analysis (TDA), as a basis for a second phase of the project, with expanded coverage to include countries within the natural limits of the Guinea Current LME. This was endorsed by the First meeting of the Committee of Ministers (see Accra Declaration), Accra, Ghana 9-10 July, 1998.

The countries have also made it clear that they wish to proceed as quickly as possible to the PDF Block B proposal so that enthusiasm and capacity are not lost.

ANNEX L

THE ACCRA DECLARATION ON THE ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT OF THE LARGE MARINE ECOSYSTEM OF THE GULF OF GUINEA

The first meeting of the Ministerial Committee of the Gulf of Guinea Large Marine Ecosystem (GOG-LME) Project took place in Accra, Ghana, on 9th and 10th July, 1998. The meeting was attended by the five Ministers with responsibility for the environment in Benin, Cameroon, Côte d'Ivoire, Ghana and Togo and the Director General/Chief Executive of the Federal Environmental Protection Agency of Nigeria.
Basing their deliberations on extensive and substantive preparations, the Committee of Ministers has adopted the Accra Declaration on Environmentally Sustainable Development of the Large Marine Ecosystem of the Gulf of Guinea.

PREAMBLE
We, the Ministers of Environment of Benin, Cameroon, Côte d'Ivoire, Ghana and Togo and the Director General/Chief Executive of the Federal Environmental Protection Agency of Nigeria responsible for the GOG-LME Project, Conscious of the fundamental importance of the health of the Gulf of Guinea Large Marine Ecosystem, including its coastal areas, to the well-being of the coastal communities, the economies and food security of the coastal states and the socio-cultural life of the Gulf of Guinea Region;

Recognising the transboundary nature of the marine environmental and living resource management problems confronting the Gulf of Guinea Region;
Concerned about the severe rates of coastal erosion, the threat of flooding, the seriousness of pollution, loss of biological diversity and depletion of fishery resources;
Conscious of the necessity to adopt a standardised regional approach in a cooperative effort to their control;
Conscious of the importance of having the means to combat the problem of coastal erosion;
Convinced of the validity of the integrated and sustainable management of the Large Marine Ecosystem to the resolution of problems, including strengthening regional cooperation and development, as well as establishing proper linkages between local, national, regional and global decision-making, and which is in fact unachievable without these said linkages;
Aware of the need to strengthen project implementation and to integrate more countries bordering the Guinea Current Large Marine Ecosystem and the necessity to enlarge the partnership notably with the inclusion of the private sector and other bilateral and multilateral donors;
Believing, therefore, that regional networking is an essential component of the system of ocean and coastal governance for the next century and beyond;
Noting and fully supporting the important achievement by the UNDP-GEF funded GOG-LME Project over the past three years, in the context of project execution by the project

countries assisted by UNIDO, UNEP and US-NOAA, especially in forging a regional approach to ecosystem management;
Cognisant of the coming into force of the UN Conventions on the Law of the Sea, of the Framework Convention on Climate Change, of the Biodiversity Convention and the Abidjan Convention on Cooperation for the Protection and Development of Marine and the Coastal Zones of West and Central Africa (WACAF, 1981);
Determined to prevent, control and reduce coastal and marine environmental degradation in our respective countries, with a view to improve living conditions and productivity,

DECISIONS
Have agreed that:

- The countries within the Gulf of Guinea should as soon as possible, establish appropriate institutional mechanisms for the planning, implementation and evaluation of Integrated Coastal Areas Management (ICAM) plans;
- Management plans and strategies, which may vary from country to country, should follow general guidelines adopted at the regional level. They should balance economic development with environmental protection and living resources conservation concerns and harmonise long-term ecosystem requirements with short-term political and economic interests;
- Efforts shall be made to initiate, encourage and work synergistically with current and/or programmed national and international programmes on integrated coastal zone management in the region. The national concerns of flooding, and pollution caused by hydrocarbons, toxic chemical products, fisheries productivity and over-exploitation and, above all, coastal erosion call for the special attention of donors;
- Data and information networking between the GOG-LME countries should be improved. National and Regional databases on the coastal and marine environment should be established using the Geographical Information System (GIS) to support decision-making, to be available to all users;
- Transfer of knowledge and experiences among the countries of the GOG-LME, through the consolidation of networks for joint monitoring, research and capacity building in the field of marine environmental and natural resource management, should be enhanced;
- Adequate and timely material and financial resources should be provided by Our Governments with support from UNDP/GEF, UNIDO as well as our private sector, bilateral and multilateral partners to the GOG-LME Project to ensure its efficient implementation and harmonious development;
- Implementation of programmes should be monitored and rigorous and objective evaluations should be conducted on a periodic basis to determine the effectiveness of programmes and the efficiency of the system in achieving the goals and objectives of the GOG-LME Project;
- The existing networks of non-governmental organisations (NGOs) in and among countries should be consolidated and expanded to ensure efficient and effective grassroots community involvement and information dissemination;
- The development of a Strategic Action Plan including a full Transboundary Diagnostic Analysis leading to the second phase of the Project to include all the

countries bordering the Guinea Current Large Marine Ecosystem, should be accelerated.

THE GULF OF GUINEA LARGE MARINE ECOSYSTEM
COMMITTEE OF MINISTERS OF ENVIRONMENT,
Accra, Ghana, the 10th of July 1998

HE Mr. S.A. AKINDES
Minister of Environment, Habitat and Urban Development of Benin

HE Mr. S. NAAH ONDOA
Minister of Environment and Forests
of Cameroon

HE Mr. A. KAKOU TIAPANI
Minister of Housing, Quality of Life and Environment of Côte d'Ivoire

HE Mr. J.E. AFFUL
Minister of Environment, Science and Technology of Ghana

HE Mr. K.S. ADADE
Minister of Environment and Forest Production of Togo

Dr. R.O. ADEWOYE
Director General / Chief Executive
Federal Environmental Protection Agency of Nigeria

ANNEX M

MINISTERS' LETTER TO GEF REQUESTING FULL PROJECT SUPPORT

LETTER ADDRESSED BY THE GOG-LME COUNTRIES TO THE UNDP ADMINISTRATOR IN JULY 1998

Dr. James Gustave Speth
Administrator
United Nations Development Programme (UNDP)
One UN Plaza
NY 10017
New York, USA

Sir,

Project EG/RAF/92/G34: Control of Water Pollution and Conservation of Biodiversity in the Gulf of Guinea Large Marine Ecosystem

During our First Committee Meeting in Accra, 9-10 July, We, the Ministers responsible for the Gulf of Guinea Large Marine Ecosystem Project of Benin, Cameroon, Côte d'Ivoire, Ghana and Togo as well as the Director General / Chief Executive of the Federal Environmental Protection Agency of Nigeria, having noted and applauded the great strides achieved in the first phase of the project in the institutionalisation of a regional approach to the resolution of our common marine environmental and natural resources management problems, have the honour to salute you and through you the Chairman/Chief Executive and the Council of the Global Environment Facility (GEF) for the bold initiative in approving and funding the project.

We wish to commend UNDP for guiding project implementation and the executing Agency UNIDO, assisted by US-NOAA and UNEP, for being faithful to GEF operational

programme requirements in meeting the expectations of Our Countries.

Each of the Countries participating in the first phase of the GOG-LME Project has already made significant national commitment in infrastructure and budgetary support. As representatives of these Countries we recognise the need for a long-term effort in the Gulf of Guinea region to improve the long-term health, productivity, and sustainability of the shared resources of the ecosystem.

Based on the results of a preliminary Transboundary Diagnostic Analysis and in order to consolidate the gains from this project, we wish to continue the project into a second phase with a geographical coverage to coincide with the natural limits of the Gulf of Guinea Large Marine Ecosystem i.e. 16 Countries between Guinea Bissau to Angola. We do hope that this second phase will enable us to further address the priority issue of coastal erosion .

To effectively pave the way for the second phase of the project, we call for the speedy approval of the PDF Block B Proposal, already submitted to GEF, for 345,000 (three hundred and forty-five thousand) U.S. Dollars for the prior development of a Strategic Action Programme for the Gulf of Guinea Large Marine Ecosystem.

Based on the above analysis We wish to request, at this stage, to earmark a further grant of about 20 (twenty) million U.S. Dollars for the second phase.

We enclose herewith a copy of the Accra Declaration adopted during our First Meeting (Accra 9/10 July, 1998) as an indication of our commitment to safeguarding our collective environment and adherence to the ideals for which GEF was established. Furthermore, we have mandated the Chairperson(s) of the Meeting to bring this Declaration to the attention of the

Ministerial level Pan African Congress on Sustainable Integrated Coastal Areas Management (PACSICOM) in Maputo (23-25 July, 1998) as well as to an appropriate forum, probably in September 1998, at the ongoing celebrations in Lisbon, Portugal, marking 1998 as the Year of the Ocean.

We pledge to continue to work with you and the GEF in bringing about positive changes in environmental and natural resources management in the African Continent and beyond.

Accept, Your Excellency, assurances of our highest consideration.

HE Mr Sylvain Adekpedjou AKINDES
Minister of Environment, Habitat and Urban Development, Benin

HE Mr Sylvestre Naah ONDOA
Minister of Environment and Forests, Cameroon

HE Mr Albert Kakou TIAPANI
Minister for Housing, Quality of Life and the Environment, Cote d'Ivoire

HE Mr J. E. AFFUL.
Minister of Environment, Science and Technology,
Ghana

HE Mr Koffi SANTY ADADH
Minister of Environment and Forestry Products
Togo.

Dr. R.O. ADEWOYE
Director General / Chief Executive
Federal Environmental Protection Agency of Nigeria.

10 July 1998, Accra, Ghana.

CC: HE Mr. Mohamed T. El-Ashry
Chief Executive Officer and Chairman
Global Environment Facility (GEF)
Secretariat
1818 H Street, N.W.
Washington DC 20433, USA

ANNEX N

ACCRA MEETING PARTICIPANTS AND CONCLUSIONS

Transboundary Diagnostic Analysis Review Task Team Meeting Report

5-6 April, 2003, Accra, Ghana.

Day one

1. OPENING :

The GCLME TDA Review Task Team Meeting was held on the 5-6 April, 2003, at the Conference Room of UNDP, Accra, Ghana.
The meeting started by 11h30 am, on the 5 April, by the sharing of copies of the 3rd draft of the TDA, to the participants. **Mr. Ukwe, Industrial Development Officer (International Waters), Water Management Unit PTC/PEM Branch, UNIDO**, opened the meeting by thanking the participants for making time available to attend the meeting. He also apologised for the delay encountered in the starting, explaining that it was due to the fact that some participants who arrived earlier due to flight availability had worked on the Draft TDA, till a very late hour, the previous day.
He then briefed the meeting on the expected outcomes of the meeting. The meeting then broke for lunch.

2. SETTINGS :

On the return, each participant introduced him/herself. The list of participants reflects this step.

Discussions went on about the way the TDA document should be presented. Two options were debated. The first suggested by Dr. Korenteng was that only the changes made to the former version of the Draft TDA should be presented, for time gain. Prof. Alo defended the option that the entire TDA Document be presented, arguing that due to the nature of the changes that were both formal and deep, it would be more efficient to present the entire Document. This second option was adopted.
Some preliminary issues were also discussed.

The first was about the accuracy of issues mentioned in the TDA document. This was answered by Prof. Ibe Who stated that, being linked to a dynamic environment and for an efficient scientific approach, no point or issue should be waived or ignored, and rather, it should be the opportunity for updating knowledge.
The second was about the definition, or the difference, the boundary between a TDA and a SAP. The Meeting agreed that a SAP should be a policy Document, a government intent or guidelines as per actions and outputs or results, drawn from the TDA, that is more technical and detailed.

The third was about the natural limits or boundaries of the GCLME. Explanation was given and accepted that the actual defined limits (Guinea-Bissau in the north and Angola in the south) should remain, as this limit countries are really influenced by the Guinea Current.

3. PRESENTATION OF THE NEW VERSION OF THE DRAFT TDA AND DISCUSSIONS:

Mr. Ukwe then went on with the Document's presentation. He started explaining the reasons for the changing of format, from the former one to the Benguela Current TDA model. He stated that the Benguela model has been adopted by GEF and had wider scale and is more detailed than the previous GCLME Draft TDA. He highlighted eleven areas falling under the five-module approach for the study of an LME.

After his presentation, the floor was opened to the participants for comments and amendments.

The first amendment was on the cover page. It was noted that it should reflect the change from six countries to sixteen countries, by bearing a more significant Logo. This task was assigned to Mr. Ndubuisi the IT Specialist/Editorial Assistant of the Project.

Before closing for the day, Profs. Afolabi and Ibe gave some guidelines for the contributions that should consider the accuracy and the appropriateness of information.

The information were to be adapted to the GCLME while aligning on the Benguela Document. They suggested an analysis of the listed issues, causes and of the three broad headings. Dr Korenteng, as the former Task Manager to the Project under the former PDF-B, was asked to have an overview of the Document and state what he felt was to be added or to be removed from the Document.

DAY TWO :

4. DISCUSSIONS ON THE NEW VERSION OF THE DRAFT TDA (CONTINUED) :

The next day, the meeting resumed at 2 PM, as convened, with the response of Dr. Korenteng to the previous day's request..

Mr. Ndubuisi presented 4 proposals and the current Document cover page was adopted. All the participants contributed highly, amending the TDA Document to be submitted to the Regional Scientific and Technical Task Team. All the changes agreed on are reflected in the TDA Document.

5. CLOSURE :

Mr. Ukwe in is closing address thanked the participants to the meeting for their time and efforts in making the meeting a success. The meeting was adjourned at about 19:00hrs.

Regional Technical and Scientific Task Team Meeting Report

8-10 April, 2003, Accra, Ghana.

INTRODUCTION

The Regional Technical and Scientific task team meeting of the Guinea Current Large Marine Ecosystem Project (PDF-B) thematised "Combating coastal area degradation and lying resources depletion in the Guinea Current Large Marine Ecosystem through regional actions" was hosted by the Ghana Ministry of Environment and Science in collaboration with the UNIDO office in Accra from 8 – 10 April, 2003 at the Conference Room of the Bay View Hotel in Accra, Ghana. The Regional Technical and Scientific task team meeting was the first of two meetings held back to back, the second being the Steering Committee meeting.

The Regional Technical and Scientific Task Team meeting was attended by participants from countries bordering the GCLME, invited experts who participated in the Gulf of Guinea Large Marine Ecosystem pilot project, representatives from UN and non-UN International Organizations, US-NOAA and a number of observers. There were also representatives from GOOS-Africa, Odinafrica project, Volta River Basin project and non-Governmental Organizations. The list of participants is given in Annex B.

OPENING

The Regional Technical and Scientific Task Team meeting was opened at 9.30 a.m. by Mr. E.O. Nsenkyire, Chief Director, Ghana Ministry of Environment and Science.

ELECTION OF RAPPORTEURS:

The Chairperson, Mr. E.O. Nsenkyire proposed Mr. Jacques Abe (Cote d'Ivoire), Mr. Blivi Togo) and Mr. E.A. Ajao (Nigeria) as rapporteurs. This was unanimously accepted by the task team.

ADOPTION OF THE AGENDA

The annotated agenda Appendix A) was adopted.

OBJECTIVES OF THE MEETING

The Chairperson introduced the Agenda item and requested Mr. Chika Ukwe, UNIDO Industrial Development Officer (International Waters) to present the objectives of the meeting, motivated by the fact that we share the same resources.

The presentation examined the background/Brief History of the Project and progression from PDF-B1 to PDF B2. He mentioned the Working Group and Stocktaking meetings held at Accra in May 2001 and the draft Regional Report on Transboundary priority issues. He enumerated as output from the meeting the six national and three regional demonstration projects for simultaneous implementation.

He noted that the objectives of the task team meetings are as follows:

a) To complete a full Transboundary Diagnostic Analysis (TDA) for the entire 16 country region and a stakeholder involvement plan;
b) To define Environmental Quality objectives (EQO's) that will provide the first step in an adaptive management strategy for the GCLME to be encapsulated in a preliminary Strategic Action Programme (SAP) to be fully developed within the first six months of the full sized project;
c) To fully define and formulate a set of nine country identified replicable and sustainable national and regional projects and complete an analysis of their benefits, incremental costs and co-funding. These projects would facilitate early implementation of selected elements of the preliminary SAP;
d) To develop a regional approach for a Regional Programme of Action on Land Based Activities (RPA/LBA) to facilitate the preparations of National Action Plans that will lead to the formulation and endorsement of a new Protocol of LBA for the Abidjan Convention, in conformance with an ecosystem approach to the assessment and management of the GCLME; and
e) To enable the commencement of preparation of the Project Brief.

The Working documents for the meeting were made available to participants.

PRESENTATIONS BY UN ORGANIZATIONS:

Presentations were made by invited experts from UN organizations. These focused *on Formulation of the RPA/LBA (Mr. Osborn); TDA/SAP and Incremental Cost Analysis (Mr. Hudson, UNEP/GPA, Andrew, GEF); GOOS – Africa (Mr. Justin Ahanhanzo, (IOC-UNESCO); odinafrica (Mr. Cisse Sekou, IOC-IOCEA); linkages between the GCLME and other IWs projects in Africa within the NEPAD Coastal and Marine Environment Action Plan (Mr. Mamaev Vladimir, UNEP). In discussions of the presentations delegates asked questions and obtained answers from the presenters.*

PRESENTATION OF 3 DRAFT REGIONAL DEMONSTRATION PROJECTS:

Three presentations on the draft regional demonstration projects were made as follows: Productivity (Mr. Wiafe/Anurigwo); EIMS (Mr. Ngundam) and Fisheries (Mr. Ajayi).

PRESENTATION OF 6 DRAFT NATIONAL DEMONSTRATION PROJECTS

Six Draft National Demonstration projects were presented by National project Country experts as follows:

1) Establishment of a Marine and Coastal Protected Area in the Republic of Benin (Mr. Djiman);
2) Integrated Management of Kribi-Limbe coastal areas in Cameroon (Mr. Folack).
3) Application of low cost technology to combat coastal erosion in Cote d'Ivoire (Mr. Abe);
4) Establishment of a Waste Stock Exchange Management System in Ghana (Mr. Asamoah-Manu, MAMSCO);

5) Nypa Palm Clearance/Mangrove Restoration Scheme in South-eastern Nigeria (Mme Ogolo); and
6) Reduction of Industrial Phosphate waste by decantation in Togo (Mr. Blivi).

PRESENTATION OF DRAFT TDA AND PRELIMINARY SAP.

Prof. O. Afolabi introduced the agenda item while Prof. Jide Alo explained the process leading to the formulation of the draft TDA and prelimary SAP. Delegates suggested the creation of a module for capacity building observed to be a dominant cross-cutting issue to address the multifaceted tasks/activities where it would be highly essential. Gender issue especially in the socio-economic module of the pilot project and the reduction/alleviation of poverty were also to be examined and incorporated as appropriate.

CONSTITUTION OF 3 WORKING GROUPS:

Participants were allocated to three working groups for brainstorming on the following:

Working Group A **: Completion of TDA (Chairperson Mr. Afolabi/Co-chair Mr.** Alo).
Working Group B: Definition of the 9 Demonstration projects (Chairperson Mr. Jacque Abe/Co chair – Mr. T.O. Ajayi).
Working Group C: Formulation of an approach for a RPA/LBA and preliminary SAP (Chair - Mr. Sikiru Adams/Co-chair – Mr. Adote Blivi)

The Working Groups were led in discussions by a chairperson and co-chair to facilitate the deliberations.

COMMUNIQUE OF THE REGIONAL TECHNICAL AND SCIENTIFIC TASK TEAM MEETING OF THE GUINEA CURRENT LARGE MARINE ECOSYSTEM PROJECT (PDF.B), HELD IN ACCRA, GHANA, APRIL 8 – 11, 2003

Recognising the achievements of the Gulf of Guinea Large Marine Ecosystem (GOGLME) pilot project and the need to truly reflect the ecosystem geographical boundaries of the influence of the Guinea Current, the regional technical and scientific task team comprising Guinea Bissau, Liberia, Guinea, Equatorial Guinea, Ghana, Nigeria, Cote d'Ivoire, Togo, Cameroon, Congo, DR Congo, Angola, Benin, Sao Tome & Principe and Sierra Leone, UNIDO, UNDP, UNEP, US-NOAA, IOC-UNESCO, AU-STRC and representatives of NGOs, met in Accra Ghana, April 8 – 11, 2003 to develop a Transboundary Diagnostic Analysis (TDA) and a preliminary Strategic Action Programme (SAP) for subsequent submission to the Global Environment Facility (GEF) for funding.

Subsequently, the meeting:

Developed a Transboundary Diagnostic Analysis (TDA), which defined five (5) major problem areas i.e.

- Decline in GCLME fish stocks and non-optional harvesting of living resources;
- Uncertainty regarding ecosystem status and yields in a highly variable environment including effects of global climate change;
- Deterioration in water quality (chronic and catastrophic) pollution from land and sea based activities, eutrophication and harmful algal blooms;
- Habitat destruction and alteration including inter-alia modification of seabed and coastal zone, degradation of coastscapes, coastline erosion;
- Loss of biotic (ecosystem) integrity (changes in community composition;

and developed causal chain analysis for each of the problem areas which included their underlying social and economic underlined causes and appropriate necessary intervention actions.

Reviewed and endorsed six national demonstration projects viz:

i) Establishment of Marine and Coastal Protected Areas in Benin;
ii) Integrated Coastal Areas Management in Cameroon;
iii) Application of Low Cost, Low Technology Options for Coastal Erosion Defence Measures in Cote d'Ivoire;
iv) Establishment of Waste Stock Exchange Management System and Transfer of Environmentally Sound Technologies for pollution prevention in Ghana;
v) Nypa Palm Clearance/Mangrove Replacement in Nigeria;
vi) Reduction of Industrial Phosphate Wastes Discharges in Togo;

And three Regional Projects viz:

i. Assessment and sustainable management of fisheries and conservation of biodiversity in the GC-LME;

ii. Integrated Regional Data and Environmental Information Management Systems for Decision- making in the GC-LME;

iii. Determination of New and Emerging Productivity Patterns in the GC-LME with regards to its Carrying Capacity for Living Resources

Developed a preliminary Strategic Action Programme (SAP):

a. to determine the long-term and short-term environmental quality objectives (EQOs);
b. to develop national action plan in accordance to SAP;
c. to formulate an approval for conducting a RPA/LBA with linkages to the Abidjan Convention; and
d. to formulate the public involvement plan for GCLME.

Further the meeting estimated the incremental project cost at USD 45 million.

Also the Meeting commended the Draft TDA Document as it succinctly and fully captured the salient and relevant issues on the GCMLE and the Region (even though there are gaps that need to be filled in the document)

Further, the Meeting recalled the request of the Ministers at their Meeting of 1998 in Accra, for a USD 20 million grant from GEF for GCLME project.

In conclusion, the meeting hereby recommends as follows:

i. The adoption of the TDA and the preliminary SAP as the project implementation document;

ii. The adoption of the revised three regional and six national demonstration projects;

iii. That the GEF financing of the GCLME project take into consideration the request of the Project Council of Ministers for a grant sum of US$20 million for the full Project;

iv. The second Meeting of the Project Steering Committee for adoption of the full TDA and Preliminary SAP, the 9 Demo Projects, the RPA/LBA Approach and the full Project Brief, to be held before 15 June 2003.

Finally, the Meeting appreciates the pledge of GEF, UNIDO, UNDP, UNEP, US-NOAA, IOC-UNESCO, AU-STRC towards the finalization and successful implementation of the GCLME project and the Government and people of the Republic of Ghana for hosting the Meeting of the Regional Scientific and Technical Task Team of the GCLME.

REPORT OF GCLME REGIONAL SCIENTIFIC AND TECHNICAL TASK TEAM – WORKING GROUP A ON COMPLETION OF TDA

CHAIR: PROF. BABAJIDE ALO

CO-CHAIR: DR. KWAME KORANTENG

The Group started working at 11.15 with Prof. Alo as Chairperson and Dr. Koranteng the co-chairperson. The Chairperson made a review of the following issues in the draft TDA document to be examined:

- Background and introduction
- Problems, causes and impacts
- Socio-economics and governance regimes (complete log frame matrices)
- Poverty alleviation and alternative livelihoods incremental costing of activities
- Outputs from each matrix activity
- On-going programmes/projects in the region
- Linkages with NEPAD Action Plan
- Long term and short term environmental quality objectives

Discussions opened with the group commending the draft TDA indicating that the draft TDA successfully captured the salient issues in the GCLME and the Region.

However, the UNDP/GEF representative, Mr. Andy Hudson remarked that the document was quite dense and therefore recommended a reduction in the "background review section" of the draft suggesting focussing on the main elements. The historical antecedents could be annexed. He recommended that for such a document to be user friendly it had to include figures, graphs and maps for hotspots, trends etc.

The UNEP/GPA Representative Mr. Mamaev recommended that we needed to fine-tune the problems and develop or establish causal chain analysis on the identified problems. The representative from the Upper Volta Basin Project commended the importance of the causal chain format which was actually used in their project.

After pertinent interventions from members, the Chairman went ahead with the delineation of the different problems from the different countries as highlighted in the Regional Synthesis Report. These include:

1. Fresh water shortage
2. Habitat and community identification
3. Unsustainable exploitation of fish and other resources
4. Decline of fish stock
5. Pollution
6. Global change
7. Coastal erosion
8. flooding

Members further indicated that it was necessary to emphasise socio-economic issues as this was inadvertently not well treated in the pilot project and the current draft TDA.

The Group then reviewed the nine problem areas in the Draft TDA and after extensive discussion defined five main transboundary problems. The five problem areas recommended were as follows:

1. Decline in GCLME fish stocks and non-optional harvesting of living resources;
2. Uncertainty regarding ecosystem status and yields in a highly variable environment including effects of global climate change;
3. Deterioration in water quality (chronic and catastrophic) pollution from land and sea based activities, eutrophication and harmful algal blooms;
4. Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion;
5. Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc).

Causal chain analysis were then carefully developed for each of these identified problems:

Problem one : Decline in GCLME fish stocks and non-optimal harvesting of living resource.

I. CAUSE

1. Increase in catch and effort

I) High demand locally and international population growth;
II) Lack of alternative livelihood;
III) Inadequate knowledge of stocks sustainability;
IV) Wrong governmental policy;
V) Inadequate capacity for fisheries management.

II. **Inappropriate Fishing Methods And Gears**

i. Lack of knowledge on basic available technology (BAT)
ii. Lack of regulatory framework;
iii. Poverty
iv. Lack of enforcement of existing laws;
v. Lack of sufficient involvement of stakeholders.

III. **Inadequate Control Of Resources**

i) Economic pressure and foreign exchange

ii) Weak or lack of management policy and enforcement;
iii) Lack of or in-operational monitoring and surveillance;
iv) Inadequate human capacity;
v) Lack of sectoral coordination
vi) Lack of and inadequate regulatory framework.

2 Problem Two: Uncertainty regarding ecosystem status and yields in a highly variable environment.

Cause

i) poor knowledge on impact of global climate change on oceanic processes.
ii) Inadequate knowledge and information on oceanic processes;
iii) Lack of data and information;
iv) Lack of human and institutional capacity climate change;
v) Lack of adequate financial support for monitoring and surveillance.

FOR THE CAUSAL ANALYSIS OF OTHER PROBLEMS See the attached Figures

3. **Problem 5: Loss of biotic ecosystem integrity**

i) over-integrity exploitation of resources;
ii) pollution and ecosystem degradation;
iii) over-exploitation of endangered species;
iv) coastal erosion;
v) Lack of data and information;
vi) Change in ocean parameters;
vii) Introduction of alien species;
viii) Oil and gas exploitation activities;
ix) Inappropriate technology;
x) Reduction of fresh water and sediment budget;
xi) Dam construction;
xii) Sand mining and land reclamation activities;
xiii) Poor coastal agricultural practices;
xiv) Deforestation of mangrove;
xv) Ineffective/inadequate policy and regulatory framework on coastal area management.

RECOMMENDATIONS OF WG A (I)

The Working Group after exhaustive deliberation unanimously agreed to the following:

1. Commends the draft TDA document as it succinctly and fully captured the salient and relevant issues on the GCMLE and the Region (even though there are gaps that need to be filled in the document)

2. Recommends that the Project administration constitute a small technical team to provide additional in-put to strengthen the draft TDA in areas of socio-economics governance and poverty alleviation issues.

3. Recommends that for this phase of the Project to be meaningful in the Region, the incremental project cost should **not be less than 45 million USD** based on the Group's critical examination of the problem issues and the necessary activities to address/resolve those issues.

Attendance List: Working Group A:

	Name	**Grade**	**Country**
1.	Fomban William	Env. Insp.	Cameroon
2.	Nassere Kaba	Directeur	Cote d'Ivoire
3.	Kombo Gumani	Ing.	Congo
4.	Loubamono Solauge	Directeur Gen. Adjoint de l'Env. Du Gabon	Gabon
5.	Brao Brown	US-NOAA	US
6.	Yaw Opoku-Ankamah	Reg. Coordinator of VRBP	Ghana
7.	Justin Abanhanzo	Coord. & Adm. Of Programmes	IOC/UNESCO
8.	Prof. Ijibd.Ahoka	President	DR Congo
9.	David L. Wiles	Project Director	Liberia
10.	Ikeah C,K.	Env. Scientist	Nigeria
11.	Prof. Adeniyi Osuntogun	Director/Chief Exec. Officer	Nigeria
12.	Victor Bonfim	Cadre Technique (Biologiste Min. de l'Environnement	Sao Tome e Principe

13.	Prof. Dapo Afolabi	Director, Fed. Min of Environment	Nigeria
14.	Prof. Bdjo Ouons Fiderico		Guinea Equatorial
15.	Mr. Kumbi Kilongo		Angola
16.	Mr. Theophile Richard		Guinea
17.	Prof. B.I. Alo	Chairman	Nigeria

REPORT OF WORKING GROUPE B
REVIEW OF THE 9 DEMONSTRATION PROJECTS

Président : **Dr Jacques Abe - Cote d'Ivoire**
Vice-président : **Prof. Ollatunde Ajayi- Nigeria**
Rapporteur : **Dr Jean Folack- Cameroon**

Membres :
1. **Dr. Jacques Abe (Chairman)**
2. **Dr. Thomas Ajayi, (co-chairman)**
3. **Ms. Parcy Abohweyere**
4. **Dr. Sam Anurigwo**
5. **Mr. Adegboyega Ajani**
6. **Mrs. Grace Ogolo**
7. **Mr. Stephen Jusu**
8. **Mr. Maloueki Lucien**
9. **Prof. John Ngundam**
10. **Dr. Jean Folack**
11. **Mr. Martial Agondogo**
12. **Dr. Santiago Osono**
13. **Dr. Adote Blivi**
14. **Mr. Kolawole Adeniji**
15. **Mr. Edward Nsenkyire**
16. **Dr. George Nia**
17. **Dr. George Wiafe**
18. **Dr. Dixon Waruinge**
19. **Dr. Pablo Huidobro**
20. **Mr. Roger Djiman**
21. **Mr. Joshua Ndubuisi**
22. **Dr. Sekou Cisse**
23. **Mr. Francis K. E. Nunoo**
24. **MAMSCO Team**
25. **Alhaji M. Jallow (FAO)**
26. **Dr A. K. Armah**
27. **Prof Chidi Ibe**
28. **Mr. Bougonon Djeri Allassani**
29. **Dr. Georges Wiafe**

The Chairman introduces the subject and precises the spirit on which dicussions should undertaken. The group adopted the following methodology :

-review of national demo projects, then regional demo projects
- Examine the conformity of the projects with the GEF guidelines
- Open Questions on the individual contain of each project

I- NATIONAL DEMO PROJECTS

In general

- the presentation should respect the GEF format
- We should keep on mind that a demo project has to state clearly its feasibility with limited funds and able to request more important funds for replicability
- establish clear linkages with Transboundary Diagnostic Analysis (TDA)
- Project benefits should be emphasized
- particular attention should be given to sustainability and on co-financing

1. Ghana :

- The project should put emphasis on its replicability
- Governance and poverty reduction are not clearly stated
- transboundary aspects should be more develop
- Global benefits should be clearly highlighted
- Additional component on waste production

2. Nigeria

- Lack of specific objectives, incremental cost analysis, logframe matrice,
Clearly justify Nypa palm problematic and economic cost analysis of Nypa Palm replacement by mangrove
- Develop the component on capacity building reinforcement as a governance element
- Poverty reduction should be analyse in the project

3. Benin

- Improve justification
- Lack of the implementation plan, incremental cost analysis
- Lack of logframe matrix

4. Côte d'Ivoire

- Sustainability of the technology using geotubes
- compare this methodology with the system using gabbions

5. Togo

- The project document lack implementation plan, incremental cost analysis and logframe matrice

6. Cameroon

- To focus on activities that could be implemented within the time frame
- Lack of the work plan

	Ghana	Nigeria	Bénin	Côte d'Ivoire	Togo	Cameroun
Context/justification			❑			
Objectives		❑				
Activities and expected results						
Risks and sustainability						
Stakeholder participation and involvement plan						
Cost of the project						
Monitoring and evaluation						
Incremental cost matrix		❑			❑	
Logframe matrix		❑	❑		❑	
Causal chain analysis	❑	❑	❑		❑	❑
Implementation/work plan			❑	❑	❑	❑

SYNOPTIC TABLE OF PROBLEMS ANALYSIS

REGIONAL DEMO PROJECTS

1. Fisheries management and biodiversity conservation

- Lack of logframework and work plan
- for countries of the pilot phase, evaluate what has being done so far and what is remaining business
- Private sector is not involved enough
- Explore utilisation of ships of opportunity

2. Productivity of the guinean Current LME

- Merge documents on plankton and nutrients
- Review incremental cost analysis
- Define geographical area of intervention

3. Environmental Information Management System (EIMS)

-Lack of incremental cost analysis and implementation plan

GEFABLE

REPORT OF WORKING GROUP C: FORMULATION OF APPROACH FOR REGIONAL PROGRAMME OF ACTION ON LAND BASED ACTIVITIES

1. Background and Rationale

1.1 Global and Regional significance of the GCLME

1.2 Basis for a preparation of the strategic Action Programme

Embodies Specific actions (Policy, legal, institutional reforms or investments) that will be adopted regionally, within a harmonized multinational context to address the priority transboundary concerns and over the longer term restore/protect the GCLME.

2. Causes of degradation and threats to the GCLME

Issues evaluated are:

1. Sewage and sanitation;
2. Solid waste (municipal and industrial);
3. Industrial effluents;
4. Heavy metal contaminants;
5. Oil pollution;
6. Nutrients;
7. Sediment mobilization;
8. Physical alterations and destruction of habitats e.g. mangrove deforestation, coastal erosion, etc.;
9. Marine litter/debris; and
10. POPs

Emerging problems from the draft TDA

1 Decline of commercial fish stocks;
2 Deterioration in water quality and catastrophies (pollution from land-based and sea-based activities, eutrophication and HABs);
3 Habitat destruction; and
4 Loss of biotic integrity

Establishment of Environmental Quality Objectives

For all the issues and problems, qualitative indicators of loss or degradation are not available. In some cases, the data and Information are not uniform throughout the region. As such further in-depth studies (e.g. surveys, assessments, etc.) are required in order to establish definitive EQO's for protection management of the coastal and Marine environment and their resources.

Also, underlying the process of degradation/destruction/alteration of various resources described in the draft TDA is a lack of an effective Institutional Framework at the National and Regional levels for collective management of the ecosystem and resources. This problem should be addressed among the priority actions outlined in a draft Preliminary Strategic Action Programme.

4.Objectives, Rationale and Priorities for the SAP

The ultimate goal of the Strategic Action Programme is to halt, reduce or show the current rate of environmental degradation. It necessarily contains priority actions that need to be undertaken at both national and regional levels by a variety of stakeholders. It is designed to assist participating countries in taking actions individually or severally within their respective policies, priorities and resources which will lead to the prevention, reduction, control/amelioration or elimination of the causes of degradation of coastal and marine environment. Achievement of the aims/goals of the SAP will contribute to the protection of human health, promote conservation and sustainable use of resources; and contribute to the maintenance of regionally/globally significant biotic diversity.

The general objectives of the SAP are therefore among others:

1. Formulation of principles, approaches, measures, using the preparation of a priority list for intervention and investments;
2. **Identification of the elements and preparation of guidelines for the formulation of National Action Plans for the protection of the marine environment and rational exploitation of coastal and marine resources consistent with the regional SAP;**
3. Detailed analysis of expected baseline and additional actions needed to resolve each transboundary priority problem;
4. Foster the involvement of regional, national, NGO, private sector and all interested stakeholders in the implementation of the SAP;
5. Foster regional and national collaboration and cooperation among interest groups and achieving elimination of duplication of efforts and wastage of human, material and financial resources

ENVIRONMENTAL QUALITY OBJECTIVES (EQOs)

The Working Group examined the "vision" for each priority issue. This status represents the long-term Environmental Quality Objective. Attempts are made at options to achieve them predicated on the casual chain they address with at least tentative timeframes for implementing them, responsible parties and relative costs, where possible. The tables represented takes the EQO's and targets, lists of specific activities that are proposed to achieve them within a specified timeframe, where possible.

The table lists priority actions/interventions according to category of intervention. It depicts the broad diversity of interventions within each category of intervention across all major EQO's and targets. It demonstrates that comparable multi-sectoral approaches can be taken to address each of the EQOs and targets.

The activities are not costed yet, but should be costed as the Programme is updated and revised during the 6 – 12 months of the full GEF Project. Each activity is classified according to category of intervention (policy, legal/regulatory, institutional strengthening, capacity building, investments, scientific investigation and data management). An

additional table could depict the activities/interventions according to category of intervention to show the broad-ranging activities within each category.

A cost-benefit analysis to support the actions/interventions of the SAP should be prepared. However, this is not possible at this stage for lack of adequate information from the draft Framework TDA. It should be completed during the full GEF project as the list of actions/interventions is technically refined and as the methodology for evaluating resource valuations is agreed within the region.

Table 1: EQO's, TARGETS AND INTERVENTIONS

EQO's	TARGETS	ACTIVITIES	INTERVENTIONS	TYPE OF INTERVENTION	ROOT CAUSE
Sustainable Commercial Fisheries	Achieve optimal sustainable yie ld by year 2015.	Establish regular stock assessment surveys of brackish, coastal and marine resources. E.g. coastal pelagics, large offshore pelagics, demersal fin fish stocks shrimp fishery and molluscs.	Enforce compliance with existing Fisheries Act and or regulation of FAO Code of Practice etc. to reduce over harvesting; obnoxious/illegal fishing practices; poaching etc.	Legislative Regulatory	Non-compliance with legislation lack of scientific information
		Conservation and protection of spawning and nurser y grounds of commercially important species.	Conservation of mangrove habitats and marine parks – official designation of such areas.	Legislative Regulatory	
		Aquaculture/mariculture practices using native species.	Establish extensive, semi-intensive and intensive fish culture and shrimp farming.	Policy Investment	Lack of traditional culture practices
			Conduct aquaculture/mariculture training courses	Scientific Information	
			Establish fish farm estates or demonstration farms.	Capacity Building	
			Train extension agents/train		

			the trainers.		
		Promote shrimp culture as a luxury commodity for export	Develop and train inspectors on HACP for Internationally accepted fish products.	Capacity building Institutional Strengthening	Lack of training Lack of Institutions
		Develop distant water trawl fisheries	Promote fishing agreements with neighbouring countries.	Investment capacity building	Lack of regional agreements

Table 2.1

EQO's	Targets	Activites	Interventions	Type of Intervention	Root Cause
Water quality that support sustainable Fisheries, Coastal and marine habitat Integrity and human health	Provide primary sewage treatment to (x%) of coastal population by (20..?) Provide secondary sewage treatment to (x%) of coastal urban population by (20..?) Substantially reduce the input of nutrients, pesticides, herbicides, and POPs to Groundwater, Rivers, Lakes, Lagoons, estuaries draining into the coastal water of the GCLME by (20..?) Substantially reduce the input of heavy metals, oil exploitation, port operations and				

	industries to the marine environment by (20..?) Halt the disposal either direct or indirect of solid waste, litter, plastics, etc. into territorial waters of the GCLME by (20..?) Substantially reduce the pollution of surface waters from atmospheric pollutants such as lead, sulphur dioxide, cement dusts, etc. By (20..?)				

Suggestion for process to develop SAP

Phase 1

- Review/inventory of Regional initiatives to address EQO's
- Review/inventory of respective national initiatives
- Draft and agree on regional guidelines for developing NAPs in accordance with SAP
- Draft protocol on LBA
- One regional meeting to agree on regional initiatives guidelines and process for developing NAPs and negotiating protocol

Approx. Cost

- Reg/invent /protocol $ 50,000
- National Inventor $ 160,000
- Reg/Meeting $100,000
- *Sub- Total* *$ 310,000*

Phase 2

- Develop NAPs
  1. Fisheries
  2. Pollution
  3. Land based
  4. Oil/shipping
- Peer review
- National meetings as required
- One regional meeting to review progress and identify enhancements to SAP

Approx. Cost
15 countries @ $ 50,000
+ $10,000
Reg.meeting $100,000

Sub- Total $ 870,000

Phase 3

- Finalisation of SAP that comprises
- Regional initiatives
- Regionally integrated NAPs
- Signing of protocol
- One regional meeting including meeting of Plenipotentaries

Approximative Cost
Publishing, etc; $ 80,000
Final Meeting $ 120,000

Sub total $ 200,000

General Total

3 Regional meetings	Cost
1 SAP	$ 310,000
16 NAPs	$ 870,000
	$ 200,000
	$ 1,380,000

REPORT OF THE MEETING OF THE REGIONAL PROJECT STEERING COMMITTEE OF THE GUINEA CURRENT LME PROJECT HELD IN ACCRA, GHANA, 11 APRIL 2003, BAY VIEW HOTEL.

2. OPENING :

The Steering Committee Meeting was held in the Conference Room of the Bay View Hotel, Accra, Ghana on Friday, 11 April, 2003.

The Meeting was introduced by Mr. Chika Ukwe at 10:05 A.M, who warmly welcomed the participants, representatives from governments, international organisations and agencies, and introduced the Chairman of the Streering Committee Meeting, H. E. Vincente Siosa, Vice-Minister for Environment, Sao Tome e Principe.

In his brief opening remarks, the Chairman lauded the purpose of the GCLME project and what it intends to achieve. He thanked the host Country, Ghana for ably hosting the meetings successfully. He admonished participants, contributing agencies and International organisations for their efforts and inputs. He expressed the hope that such a meeting at the regional level be held in the future to address regional problems.
The representative from UNEP praised the organisers of the Meeting for the successful implementation of the objectives of the GCLME project. He also showed gratitude to the Ghanaian Government through the Ministry of the Environment and Science for the warm hospitality extended to delegates to the meetings in Accra.

US-UOAA representative expressed his organisation's willingness to work co-operatively with the GCLME project, especially in the area of technical support.

UNIDO's representative expressed optimism about the positive out come that is expected when the GCLME project is implemented and also stressed the continue support from UNIDO.

UNDP, another contributing organisation to the G CLME project also expressed its continue support to the GCLME project.

The representative from GEF also lauded the organisers of the meeting, the host country, Ghana and all delegates for their commitment to the success of the GCLME project. He reiterated the tight financial situation that GEF is faced with. He stressed GEF support to the GCLME Project is around ten (10) to 15 (fifteen) million Dollars. He said extra money will be sought from other sources. He reminded the delegates to think seriously about Country's Co-financing contributions to the GCLME Project.

Representatives from UNESCO and ILO also lauded the importance of the GCLME Project and hope that this regional approach to solve common problems is commendable.
In a brief address, the representative from the Minister of Environment and Science regretted the absence of the Minister due to official engagements. He expressed satisfaction for the successful hosting of the GCLME Project Meetings in Accra, Ghana. He expressed happiness that all the delegates to the Meetings had a wonderful stay in Accra.
Before closing the Opening Ceremony, for the Coffee break, H.E. Vicente Siosa, Chairman of the Meeting expressed satisfaction because he said, the meeting has afforded the opportunities for learning and taking important decisions relating to the GCLME Project. He again thanked the Ghanaian Government and all those responsible for organising the Meetings for a job well done.

3. ADMINISTRATIVE ARRANGEMENTS :

Returning from the Break, the Meeting resumed at about 11:00 hrs. Prof. David L. Wiles, Sr. from Liberia and Mme. Nessere kaba from Côte d'Ivoire were nominated by Mr. Chika Ukwe to serve as Rapporteurs for the steering committee meeting. They were unanimously elected Rapporteurs by the Committee.

The National Project Directors from the (16) Sixteen Countries of the GCLME Project were asked to pronounce their views on the GCLME Project Meetings held in Accra, Ghana, April 8-11, 2003.

All delegates from the sixteen (16) Countries expressed satisfaction with the manner in which the meetings were organised and conducted. All delegates also expressed gratitude to the host country, Ghana and the contributing International organisations and agencies for their support to the GCLME Project..

4. EXAMINATION OF THE RECOMMENDATIONS FROM TASK TEAM MEETINGS (REVISED TDA AND PRELIMINARY SAP; 9 DEMONSTRATION PROJECT PROPOSALS; APPROACH FOR RPA/LBA; AND WORK PLAN) :

Reports from the three Task Team Meetings were presented. Working Group A was responsible for the completion of the TDA and the formulation of preliminary SAP. Working Group B was responsible for the Definition of the Nine demonstration Projects, while working Group c was responsible for the formulation of the RPA/LBA.

a. Working Group A.

The chairman introduced the tasks the Group had to undertake. He indicated that it was necessary to emphasize the socio-economic issues as this was inadvertently not well treated in the pilot projects and the current draft TDA. The Group then reviewed the Nine (9) problems areas in the draft TDA and after extensive discussion, defined five (5) main transboundary problems (see Group A Report). Group A also work extensively on the problems of environmental Quality Objective and Environmental Quality standards (EQOs/EQS.). After exhaustive

deliberation, Group A unanimously concluded on 6 (six) problem areas on the TDA.

b. Working Group B

This Group reviewed the six (6) countries demonstration Projects and three (3) regional demonstration Projects. The working Group adopted the following Methodology: the Group reviewed the (6) six countries demonstration Projects and the three (3) regional demonstration Projects; opened questions on the individual content of each projects and presented a synoptic table of problems analysis of the six countries demonstration Projects and the three regional demonstration projects (see Group B report.)

c. Working Group C

Working Group C was responsible for the formulation of approach for regional programmes of action on Land based activities and a regional plan of Action (LBA/RPA). The Group reported that LBA/RPA forms the basic for the preparation of strategic action plan programmes which embodies specific actions (policies, legal, institutional reforms or investments) that will be adopted regionally, within a harmonized multinational context to address the priority transboundary concerns and over the longer term restore/protect the GCLME. Group C also reviewed the background and rationale, the causes of degradation and threats to the GCLME, the establishment of environmental quality objectives, and the objectives, rationale and priorities for a SAP, suggestions were made for process to develop SAP was outlined in the Group's report.

The three Task Team Working Group's reports were accepted by the steering committee. It was agreed that all three Task Team working Groups have done with satisfaction what they were required to do. The Task Team working groups were commanded for accomplishing their tasks.

5. ANY OTHER BUSINESS :

A Project brief preparation schedule was presented outlining activities leading to the GEF council meeting's funding decisions to the GCLME Project. The steering Committee also agreed on the importance of identifying the various sources and amounts of funding that each of the sixteen (16) Countries will provide to the full GCLME Project.

The draft Communiqué of the regional technical and scientific Task Team of the Guinea Current Large Marine Ecosystem Project (PDF-B) was read. The floor was subsequently opened for discussion of the draft communiqué by Dr. Blivi. It was observed that there was no French version to the draft Communiqué. This made it difficult if not impossible for the French speaking delegates to fully discuss the Communiqué.

Dr. Abe stressed that it is normally the tradition of most united nations organisation and most International organisations to use one language for the preparation of document or proposal and after the completion of the document or proposal, the final document or

proposal is then translated into different languages for the benefit of delegates. He stated that the French version of the final communiqué will be released before the meeting adjourns.

Mr. Chika Ukwe pointed out that it should be discussed and corrected and that the communiqué will not be adopted at the Accra meeting because final draft of the communiqué will have to be prepared. Dr. Abe stated that the final draft communiqué will be adopted at a planned steering committee meeting in Abuja, Nigeria in June 2003.
It was observed by one delegate that the meeting made mention about programmes of the six countries that participated in the demonstration projects and that the ten new countries just participating in the GCLME Project should have presented their respective country's coastal profiles, but this was not done during the meeting. Dr. Abe responded by saying that no work plan have been developed yet. Without a work plan, the new participating countries coastal profiles could not be prepared.
.

6. ADOPTION OF SUMMARY REPORT :

After the discussion and corrections of the draft communiqué, a final draft of the communiqué of the Regional Technical and Scientific Task Team Meeting of Guinea Current Large Marine Ecosystem Project (PDF.B) was prepared in English and French. The final communiqué included recommendations to governments and institutions and also to co-implementing/executing agencies for the formulation of the full GCLME Project brief.

7. CLOSURE:

The chairman of the steering committee in is closing address thanked the delegates to the meeting for their time and efforts in making the meeting a success. The meeting was adjourned at about 1700hrs.

Resolution of The Steering Committee

The Steering Committee Meeting held on the 11th of April, 2003 in Accra, Ghana

Acknowledging the significant and veritable results of the Regional Scientific and Technical Task Team Meeting and the important and enthusiastic inputs from the sixteen participating countries;

Considering the need to continue the activities started in the 6 pilot phase countries, as well as the need to extend the project activities to the other countries within the natural limits of the Guinea Current Large Marine Ecosystem, consistent with the principles of the GEF Operational Strategy and Operational Programs;

Noting the positive contributions made by GEF, UNIDO, UNDP, UNEP and US-NOAA towards the successful implementation and execution of this PDF-B, and the efficient and effective manner in which the project has been managed both at the national and regional levels;

Appreciating the decision of the GEF Secretariat in providing funding for this Supplementary PDF-B;

Underscoring the key remaining priorities to complete the GC-LME Project Preparation Process to ensure funding for this extremely important project for the peoples and environment of the GC-LME Region;

The delegates from the Governments of Angola, Benin, Cameroon, Congo, Côte d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sao Tome & Principe, Sierra Leone and Togo, and Representatives from UNDP/GEF, UNIDO, UNEP, US-NOAA, IOC-UNESCO, the AU-STRC, the Regional Coordination Unit of the Abidjan Convention and representatives of NGOs,, meeting as the Project Steering Committee in Accra on the 11th of April 2003,

Hereby resolve as follows:

1. The sixteen countries should provide adequate levels of co-financing including full documentation of country inputs, bilateral donors and private sector commitments for the :
    - 6 national and 3 regional demonstration projects; and
    - core project activities
2. The sixteen countries should provide detailed information and project national baseline funding including on all national environmental projects/programmes and activities pertinent to the protection of the GCLME already undertaken by the countries since inception of the initial PDF-B in October, 2001 and also planned throughout the timeframe of the full project (next four to five years).

3. The sixteen countries should initiate dialogue with their respective GEF Operational Focal Points (OFPs) on the full GC-LME Project, if they have already not done so, in order to ensure the full support and endorsement of the OFPs for the full Project Brief.

4. Complete preparation of the TDA before the next Steering Committee Meeting in June, 2003, based on the comments and recommendations from the Regional Scientific and Technical Tasks Team and Steering Committee Meetings.

5. Complete the revision of the preliminary SAP, and in particular, the long term Environmental Quality Objectives (EQOs) linked to the formulation of the RPA/LBA Approach and subsequently a Protocol to the Abidjan Convention.

6. Finalise the six (6) national and three (3) regional demonstration projects including projects descriptions, work plans, budgets and co-financing arrangements, taking into consideration the comments of the Regional Scientific and Technical Task Team Meeting.

7. Prepare the full Project Brief for consideration and adoption by the Steering Committee at its next Meeting in 11-12 June, 2003 in Abuja, Nigeria.

Accra, 11th April, 2003

GCLME Project
TDA Review Task Group Meeting
05-06 April, 2003
UNIDO Office, Accra, Ghana
List of Participants

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13.	Mr. Ukwe Chika	Industrial Development Officer (International Waters) UNIDO, PTC/PEM Branch Water Management Unit Vienna International Centre PO Box 300, Vienna A-1400, Austria Tel : 43-1-260263465 Fax : 43-1-260266819 E-mail : c.ukwe@unido.org
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ANNEXES:

GUINEA CURRENT LARGE MARINE ECOSYSTEM PROJECT (PDF-B)
REGIONAL TECHNICAL AND SCIENTIFIC TASK TEAM MEETING
BAY VIEW HOTEL ACCRA, GHANA 8-10 APRIL 2003

Annotated Agenda

Day 1

	ITEMS			Time
1.	**Opening of Meeting**			
1.1	Registration of Participants			8:30-9:30
1.2	Opening Ceremony (Different Programme)			9:30-10:30
1.3	**Coffee Break**			**10:30-11:00**
2.	Administrative arrangements, Election of Rapporteurs (Mr. Nsenkyire)			11:00-11:10
3.	Objectives of the Meeting (Mr. Ukwe)			11:10-11:20
4.	Presentation of Working Documents for the meeting (Mr. Ukwe)			11:20-11:30
5.	UNEP presentation on formulation of the RPA/LBA (Mr. Mamaev/Mme Kaba)			11:30-11:50
6.	Presentation on TDA/SAP and Incremental Cost Analysis (Mr. Hudson & STC)			11:50-12:30
7.	Presentation by BCLME CTA on Experiences and Lessons learned in formulation of TDA/SAP: Discussion of areas of collaboration (Mr. O'Toole)			
8.	**Lunch Break**			**12:30-13:30**
9.	Presentation by GOOS-Africa and discussion on synergy b/w GCLME; GOOS-Africa and ODINAFRICA (Mr. Ahanhanzo-GOOS-Africa & Mr. Blivi- ODINAFRICA)			13:30-13:50
10.	Linkages between the GCLME and other IWs projects in Africa within the NEPAD Coastal and Marine Environment Action Plan (Mr. Mamaev)			13:50-14:10
11.	Presentation of 3 draft Regional Demo projects **(**Mr Ajayi (Fisheries); Mr. Wiafe/Anurigwo (Productivity) Mr. Ngundam (EIMS)			14:10-15:00
12.	Presentation of 6 draft National Demo projects (National Project Directors/Country Experts)			
	Benin	:	Mr. Worou	15.00-15.20
	Cameroon	:	Mr. Folack/Mr. Fomban	15.20-15.40
	Côte d'Ivoire	:	Mme Kaba/Mr. Abe	15.40-16.00
13.	**Coffee Break**			**16:00-16:30**
14.	Presentation of 6 draft National Demo projects (National Project Directors/Country Experts) (continued)			
	Ghana	:	Mr. Nsenkyire/Mr. Asamoah-Manu (MAMSCO)	16:30-16:50
	Nigeria	:	Mme Ogolo	16:50-17:10

	Togo : Mr. Djeri-Alassani / Mr. Blivi	17:10-17:30
15.	Presentation of Draft TDA and preliminary SAP (Mr. Barnes/Mr. Acquah/Mr. Alo)	17:30-18:00
16.	Formation of 3 Working Groups **Working Group A: Completion of TDA and Formulation of preliminary SAP** **Working Group B: Definition of the 9 Demonstration Projects** **Working Group C: Formulation of an approach for a RPA/LBA**	18:00-18:20
17.	Adjournment	**18:20**

Day 2 : 9 April

	ITEMS	**Time**
18.	Opening & briefing on Working Groups sessions (Mr. Nsenkyire/ Mr. Ukwe)	**9:00-9:10**
19.	Working Group Sessions **Working Group A: Completion of TDA and Formulation of preliminary SAP** **Working Group B: Definition of the 9 Demonstration Projects** **Working Group C: Formulation of an approach for a RPA/LBA**	9:10-11:00
20.	**Coffee Break**	**11:00-11:30**
21.	Working Group Sessions II	11:30-13:30
22.	**Lunch Break**	**13:30-14:30**
23.	Working Group Sessions III	14:30-16:30
24.	**Coffee Break**	**16:30-17:00**
25.	Working Group Sessions IV	17:00-18:30
26.	**Adjournment**	**18:30**

Day 3 : 10 April

	ITEMS	**Time**
27.	Plenary Session: Opening (Mr. Nsenkyire/ Mr. Ukwe)	**9:00-9:10**
	Presentation on LMEs of West Africa by US-NOAA (Mr. Ken Sherman)	
28.	Reports of Working Group Chairmen and Rapporteurs including recommendations (30 minutes each) **Working Group A: Completion of TDA and Formulation of preliminary SAP** **Working Group B: Definition of the 9 Demonstration Projects** **Working Group C: Formulation of an approach for a RPA/LBA**	9:10-11:00
29.	**Coffee Break**	**11:00-11:30**
30.	Adoption of summary reports of Working Groups and recommendations to Steering Committee	11:30-12:30

31.	Presentations by AfDB/AU-STRC/ ECOWAS/ other regional institutions: Linkages between GCLME and their coastal & marine environmental Programmes	12:30-13:00
32.		**13:00-14:00**
33.	Future perspectives including implementation strategies (Mr. Ukwe/Mr. Hudson/Mr. Mamaev)	14:00-14:30
34.	Full Project Brief- design, targets, budget and implementation arrangements- constitution of Drafting Group (Mr. Nsenkyire/ Mr. Ukwe/Mr. Hudson/Mr. Mamaev)	14:30-15:00
35.	Co-financing arrangements and Conclusion (Mr. Nsenkyire) Open Discussion	15:00-16:30
36.	3e Session des Travaux en Commissions	14:30-16:30
37.	**Coffee Break**	**16:30-17:00**
38.	**Closing & Adjournment of meeting (Mr. Nsenkyire/ Mr. Ukwe)**	**17:00-18:00**

GUINEA CURRENT LARGE MARINE ECOSYSTEM PROJECT (PDF-B)

STEERING COMMITTEE MEETING

BAY VIEW HOTEL ACCRA, GHANA 11 APRIL 2003

Annotated Agenda

	ITEMS	**Time**
1.	Opening of Meeting	
1.1	Registration of Participants	8:30-9:30
1.2	Opening Ceremony (Different Programme)	9:30-10:30
1.3		**10:30-11:00**
2.	Administrative arrangements, Election of Rapporteurs, (Mr. Nsenkyire)	11:00-11:10
3.	Recommendations from Task Team Meetings	11:10-11:30
4.	Discussion & Adoption of Revised TDA and preliminary SAP; 9 demonstration project proposals; Approach for RPA/LBA; and Work Plan (Mr. Nsenkyire/Mr. Ukwe/Mr. Barnes/Mr. Abe/ Mme Kaba)	11:30-12:30
5.	**Lunch Break**	**12:30-14:00**
6.	Conclusions including recommendations to governments and instructions to co-implementing/executing agencies for formulation of full Project Brief	14:00-16:00
7.	**Coffee Break**	**16:00-16:30**
8.	**Closing & Adjournment of meeting**	**16:30-17:00**

2nd REGIONAL WORKSHOP FOR THE PDF-B GCLME
CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. **The 2nd Regional Workshop for the GCLME was held from 14-18 June 2003 in Lagos and Abuja, Nigeria.**
2. **The Workshop discussed the gaps identified in the GCLME TDA and provided updates to the TDA. The workshop concluded that further work is needed to fill the identified gaps prior to its submittal to the GEF, and agreed to provide final information and data from countries to the International consultant by 30 June 2003. Subject to filling the identified gaps, the Meeting found the TDA to be scientifically sound and complete subject to the afore-mentioned changes.**
3. **The Workshop reviewed and updated the Preliminary SAP including the EQO's, targets and priority activities. The meeting found the SAP to be scientifically sound and based on the findings of the TDA, and to be complete subject to changes identified at the Meeting.**
4. **The Workshop found the Draft Project Brief to be technically sound, to properly reflect the priorities identified in the TDA/SAP, and to be complete subject to changes and detailed costing of the agreed activities reflecting the input from GCLME countries identified during the Meeting.**
5. **The Workshop noted that the Project Brief, TDA and preliminary SAP must be submitted to the GEF Scientific and Technical Advisory Panel Roster by mid-August 2003, to meet the requirements for submission to the November 2003 GEF Council Meeting.**
6. **Following receipt of the STAP Roster Review, and after addressing these comments, the revised Project Brief, the TDA and the Preliminary SAP must be submitted to the GEF Secretariat by 12 September 2003.**
7. **The Workshop reviewed and agreed on the Institutional Arrangements for the implementation of the GEF GCLME Project.**

RECOMMENDATIONS

1. **The Workshop recommends that the Steering Committee accept the TDA as technical input to the GCLME SAP, subject to modifications from the countries identified during the Meeting, and finalization by the International consultant.**
2. **The Workshop recommends the acceptance of the Preliminary SAP, subject to modifications identified at the Meeting.**
3. **The Workshop recommends that the Steering Committee approve the Draft Project Brief for submission to GEF and to the GEF Operational Focal Points of each GCLME country for their endorsement, subject to modifications identified at the Meeting.**
4. **The Workshop recommends that the Steering Committee adopt the Institutional Arrangements for the implementation of the GEF GCLME Project as discussed during the Meeting, and presented as Figure 1.**

Resolution of The Steering Committee

The Steering Committee Meeting holding on 19 June, 2003 in Abuja, Nigeria

Considering the need to extend the project activities started in the 6 pilot phase to 10 additional countries within the natural limits of the Guinea Current Large Marine Ecosystem, consistent with the principles of the GEF Operational Strategy and Operational Programs;

Noting the immense inputs by the countries, and the positive contributions of GEF, UNIDO, UNDP, UNEP and US-NOAA in the successful implementation of the PDF-B process, and the efficient and effective manner in which the project has been managed both at the national and regional levels;

Acknowledging the significant and veritable results of the meeting of the Regional Scientific and Technical Task Team (Lagos and Abuja, Nigeria, 14-18 June, 2003) drawn from the sixteen participating countries which completed the TDA, formulated a preliminary SAP and prepared a draft Project Brief;

Appreciating the willingness of the GEF to provide funding for this extremely important project for the peoples and environment of the GCLME Region and beyond;

Recalling the request forwarded to UNDP (GEF) by the Committee of Ministers of the Pilot Phase Project for a grant of US$ 20 millions for the GCLME Project;

The delegates from the Governments of Angola, Benin, Cameroon, Congo, Côte d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sao Tome & Principe, Sierra Leone and Togo, and Representatives from UNDP/GEF, UNIDO, UNEP, US-NOAA, IMO, AfDB, IOC-UNESCO, the AU-STRC, the Regional Coordination Unit of the Abidjan Convention and representatives of NGOs, meeting as the Project Steering Committee in Abuja, 19 June, 2003,

Hereby resolve as follows:

8. To accept the Transboundary Diagnostic Analysis, the Preliminary Strategic Action Programme, and the Draft Project Brief, for submittal to GEF Council at the earliest opportunity.

9. Mandate the Executing Agency, UNIDO, to submit to GEF Secretariat through the Implementing Agencies, UNDP and UNEP, the finalised Project Brief, (including all annexes and attachments) following endorsement by the GEF Operational Focal Points of participating countries.

822.1

Vladimir Mamaev

United Nations Environment Programme,
UNEP/DGEF
P.O. Box 30552
UN Avenue, Gigiri
Nairobi
KENYA

2003

Rodney Lobo

17/10/03

10. The sixteen countries, the organised private sector, bilateral/multilateral donors, Non-Governmental Organisations, should provide in writing, pledged-co-financing in support of GEF incremental cost allocation which should take into account the detailed costing of agreed activities.

11. Adopt the institutional arrangements shown in Annex 1 of this Resolution as the basis for the implementation of the GCLME Project.

12. Thank the Government of the Federal Republic of Nigeria for hosting the meetings of the Regional Scientific and Technical Task Team (Lagos, 14-15 June, 2003; Abuja, Nigeria, 17-18 June, 2003) and the Regional Project Steering Committee (Abuja, 19 June, 2003)

Abuja, 19th June, 2003

Guinea Current Large Marine Ecosystem Project (GCLME)

PRELIMINARY

Transboundary Diagnostic Analysis

U N I D O U N D P U NEP GEF US-NOAA

Regional Project Coordinating Centre, Abidjan, Cote d'Ivoire,
September 2003
A Programme of the Governments of the GCLME countries, with the assistance of GEF/UNIDO/UNDP/UNEP and US-NOAA

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1.0 Background and Introduction

1.1 TDA Content and Process

The ultimate goal of the Guinea Current Large Marine Ecosystem (GCLME) Global Environment Facility (GEF) Project,[1] like other Large Marine Ecosystem (LME) approaches, is to secure the development of a regional Strategic Action Programme (SAP) by the countries of the GCLME to facilitate regional commitment to integrated management of GCLME coastal areas and marine ecosystem and sustainable use of its resources. The first step to the development of the Regional SAP is the preparation of a Transboundary Diagnostic Analysis (TDA).

A Transboundary Diagnostic Analysis is a scientific and technical assessment through which the water-related environmental issues and problems of a region are identified and quantified, their causes analysed and their impacts, both environmental and economic, assessed. The analysis involves the identification of causes and impacts (and uncertainties associated with these) at national and transboundary levels, and the socio-economic, political and institutional context within which they occur. The identification of the causes should, where appropriate, specify sources, locations and sectors. The TDA should indicate which elements are transboundary in nature and list and prioritise activities or solutions to address the issue/problem and its root causes.
Within the context of the TDA, *transboundary* environmental issues include *inter alia*:

- regional/national issues with transboundary causes/sources;
- transboundary issues with national causes/sources;
- national issues that are common to at least two of the countries and that require a common strategy and collective action to address;
- issues that have transboundary elements or implications (e.g. fishery practices on biodiversity/ecosystem resilience).

The objective of the Guinea Current TDA is to provide, on the basis of clearly established evidence, structured information relating to the degradation and changing state of the GCLME, to scale the relative importance of the causes and sources of the transboundary water-related problems, and to elucidate practical preventative and remedial actions to ensure the sustainable integrated management of this unique environment. The TDA would provide the technical basis for the development of a SAP, and the full Project Brief, for the GCLME within the International Waters Focal Area of the GEF.

The GCLME Regional Strategic Action Programme once developed and adopted by the participating countries for implementation would re-affirm the joint-commitments to regional co-operation under the tenets of Agenda 21, the Abidjan Convention, the GEF Operation Strategy, the Global Programme of Action on the Protection of Marine Environment from Land-Based Sources, the World Summit on Sustainable Development (WSSD) Plan of Implementation, and the FAO Codes of Conduct for Responsible Fishing.

1.2 Design of the Guinea Current Preliminary TDA

Comprehensive information about the status of the GCLME, the principal issues and problems, their causes and impacts, was generated at the Regional GCLME Working Group and Stocktaking

[1] See Appendix II for a brief history of the GCLME project.

Workshop held in Accra, Ghana from 14-17 May 2001 within the framework of implementation of the initial PDF B. The suite of eleven Thematic/Sectoral Reports covering the five modules of the LME and the national reports from the sixteen countries were examined at the Workshop, synthesised into a Regional Report and then condensed into a series of analytical tables. These are presented in this document.

While much data were obtained through this process, each country provided only partial information on the environmental status, so this Preliminary TDA is a summary of available information only. The major sources of information are listed in the bibliography accompanying this TDA. Gaps in information available for the Preliminary TDA can be filled during the full GEF project when the TDA will be updated and completed.

Several steps were undertaken to develop the current Preliminary TDA. These are as follows:

1.21 Identification of Major Perceived Problems and Issues (MPPIs)

The identification of the major perceived[2] issues is the first step in the TDA process. The MPPIs are addressed from a status perspective. It answers the questions: What do we know about this problem/issue? What data support the quantification of the extent of the problem/issue? Do the data support these as real problems and issues, or just as perceptions? This analysis took place on a scientific level, including biological, hydrological, physical, social and other perspectives on the problem.

The following four MPPIs were identified in the GCLME:

- Decline in GCLME fish stocks and unsustainable harvesting of living resources;
- Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including effects of global climate change;
- Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms;
- Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion.

1.2.2 Causal Chain/Root Cause Analysis

Based on the causal chain concept, this analysis identifies the underlying factors or root causes that contribute to the major perceived problems and issues so that these can be addressed in the implementation of the SAP. As such it improves recognition of connections between the components of the environmental and socio-economic sub-systems through a causal chain analysis. Identification of root causes is important because root causes tend to be more systemic and fundamental contributors to environmental degradation. Interventions and actions directed at the root causes tend to be more sustainable and effective than interventions directed at primary or secondary causes. Because the linkages between root causes and solutions of the perceived problems are often not clear to policymakers, however, interventions commonly are mistakenly directed at primary or secondary causes. This Preliminary TDA attempts to clarify

[2] "Perceived" is used to include issues which may not have been identified or proved to be major problems as yet due to data gaps or lack of analysis or which are expected to lead to major problems in the future under prevailing conditions.

the linkages between root causes and the major perceived problem to encourage interventions at this more sustainable level.

1.2.3 Synthesis Matrix

The Synthesis Matrix serves as a logistical "map" for the TDA. It examines the transboundary elements of the MPPIs and then relates them to their major underlying institutional, societal or global root causes. In all cases the root causes are common to a large number of problems and require changes to the role given to environmental issues within the priorities of the governments and the public in general. The matrix identifies three generic areas (issues) where proposals for action can be formulated, viz utilization of resources, environmental variability and pollution/ecosystem health. For each of these generic areas a number of more specific issues ("sub-issues") are identified. A simplified version of the Synthesis Matrix is provided in Figure 7.0-1.

1.2.4 Priority Areas of Future Interventions

The nature of the specific MPPIs identified as contributors to ecosystem degradation and change in the Guinea Current region are examined in terms of management uncertainties (in the case of environmental variability, the uncertainty of the variability per se) and knowledge gaps which need to be filled. They present priority practical and implementable proposals for inclusion in the GCLME SAP and the cost of the required international action where possible. Finally the series of tables identify the outputs (products), which should be obtained through the successful implementation of the action and lists the stakeholders for each problem and action area identified.

1.2.5 Ecological Quality Objectives (EQOs)

Because the list of possible interventions and actions arising from the analysis of the GCLME problems is so large, a mechanism was needed in order to prioritize the interventions. Borrowing from methodology commonly used in the European Union and other regions, the present Preliminary TDA identifies a series of draft EQOs, which represent the regional perspective of major goals for the regional environment. The use of EQOs helps to refine the TDA process by achieving consensus on the desired status of the GCLME. Within each EQO (which is a broad policy-oriented statement), several draft specific targets were identified. Each target generally has a timeline associated with it, as well as a specific level of improvement or target status. Thus, the targets illustrate the chain of logic for eventual achievement of the EQO.

1.3 Towards a Sustainable Future in the GCLME Region: The Next Steps

It was quite apparent after the Regional Working Group and Stocktaking Workshops during the initial PDF B phase that an enormous amount of goodwill, information and ideas had been generated within the region relevant to the sustainable management of the Guinea Current ecosystem. This bodes well for the future and provides a strong foundation, not only to develop a viable LME approach to the Guinea Current region, but also to provide a blueprint for how open-system LMEs should be developed internationally.

Correcting decades of over-exploitation of resources and habitat degradation in the Guinea Current ecosystem and the fragmented and sectorally based management actions (the consequence of the colonial/political past and greed) will require a substantial coordinated effort during the next decade, to be followed by sustained action on a permanent basis. A task of this magnitude will

require careful planning not only by the government agencies in the sixteen countries bordering the Guinea Current, but also by the other stakeholders. There already exists the willingness on the part of the key players to collaborate to achieve this objective, but the real challenge will be to develop systems and structures that address the naturally highly-variable and potentially fragile nature of the GCLME and its coastal environments within the context of a changing society and world. The many issues and problems, as well as possible solutions, have been identified and prioritized in the TDA tables. The resolve of the governments of the sixteen countries to correct the wrongs of the past and move forward with a new vision to ensure that the GCLME can be sustainably utilized and enjoyed by future generations for the benefit of all would be embodied in the SAP, the elements of which together with the EQOs, have been formulated during the implementation of the supplementary PDF-B phase. The full SAP would be finalized and endorsed by all the countries during the full project phase. It is to be much more than just a piece of paper: it is to be a pragmatic, workable framework and unambiguous statement of common goals and objectives and the means of their achievement. Success will depend on thorough implementation of the principles, commitments and actions to be embodied in the SAP, both explicit and implicit.

In order to accelerate SAP implementation, a portfolio of nine regional and national pilot demonstration projects addressing previously-identified priority transboundary concerns conforming to the five LME operational strategies/modules (productivity, fish and fisheries and other living resources, pollution and ecosystem health, socio-economics, and governance) would be implemented during the full project phase.

In the TDA synthesis and analysis tables for a number of major transboundary problems in the GCLME have been identified. These include *inter alia*, non optimal harvesting of living resources, uncertainty regarding ecosystem status and yields in a highly variable environment, deterioration in water quality, habitat destruction and alteration, coastal erosion, loss of biotic integrity and threat to biodiversity, introduction of alien species, and inadequate regional capacity (human and infrastructure). Over-arching generic actions which are needed to address these transboundary problems must focus on capacity strengthening and training, legal policy development and harmonization of legislation, transfer of environmentally sound technologies and development/strengthening of regional collaboration or networking in respect of surveys and assessment of the ecosystem status.

Specific actions required in the near future in the GCLME will include *inter alia*:

- development and implementation of joint fish stock assessments and development of stock management plans among the participating countries
- facilitation of appropriate transboundary frameworks and mechanisms at regional, national and local levels for consultation, coordination and cooperation;
- development of institutional capacities of the key agencies and institutions in the region that contribute to the integrated sustainable management of the GCLME;
- effective ecosystem assessment and development of an early warning system for ecosystem change;
- actions to fill the gaps in our understanding of the GCLME, its functioning, and the factors which affect it (biophysical, social, economic and political);
- harmonization of policies and legislation relating to activities affecting GCLME;
- activities to minimize and mitigate the negative impacts of development (mining, urbanization, tourism development, resource exploitation) through the promotion of sustainable approaches and the use of appropriate tools;
- measures to improve sustainable resource management;

- measures to protect biological diversity and restore globally significant habitats including wetlands;
- measures to protect the coastlines from the incidence of coastal erosion;
- quantification of the impact of global climate change on the GCLME

Policies, structures and actions developed during the implementation phase of the GCLME Programme, i.e. over the next five years, must by the end of the period be self-sustainable in the region. To achieve this it is essential that mechanisms be in place to encourage, indeed ensure, a substantial degree of co-financing of activities. This can best be done by involving and developing partnerships with maritime and coastal industries, the international community and present and future beneficiaries, i.e. all those who have a stake in the long-term health, productivity and viability of the Guinea Current region as a, LME.

2.0 Physical and Biogeochemical Setting

2.1 Geographic Scope & Ecosystem Boundaries

Conducting a comprehensive transboundary analysis is only possible if the entire LME, including all inputs to the system, is covered in the study. In the case of the Guinea Current region, which is an open system where the environmental variability is predominantly remotely forced, this should then include the tropical Atlantic *sensu latu*, the Canary and Benguela Currents and the drainage basins of all major rivers which discharge into the greater Guinea Current region including the Niger, Volta and Congo Rivers. Clearly such an all-encompassing approach is impracticable in a single project, and more realistic and pragmatic system boundaries have to be defined in order to develop and implement a viable ecosystem management framework.

In the Atlantic basin, the current systems are dominated by the effect of the two gyral currents of the north and south hemispheres. In each hemisphere a cold current flows towards the equator along the eastern oceanic margin – southward-flowing Canary Current in the north and northward-flowing Benguela Current in the south. The northern boundary of the Guinea current region is formed by a northward-flowing strong thermal front between the warm Gulf of Guinea waters and a southerly extension of cool waters from the Mauritanian and Senegalese upwelling area, sometimes called the Senegalese upwelling influence (SUI). Offshore, the SUI generally migrates from north of 15°N to south of 7°N on a seasonal basis, providing a fluctuating, but distinct boundary to the region. At the coast, however, the seasonal amplitude in boundary position is reduced and remains northward of the Bizagos Islands throughout the year. The SUI shows different seasonal and interannual patterns of variability to Gulf of Guinea waters.

The southern boundary of the Guinea Current region is less well defined, but is generally thought to be formed by the South Equatorial Current (SEC). The SEC also forms the northern limb of the South Atlantic subtropical gyre and is fed by the Benguela current. From the foregoing, it is obvious that the oceanography of the Guinea Current region is influenced by both equatorial dynamics from the north and seasonal cold-water upwelling in the south.

In summary, the boundaries of the Guinea Current area can be defined geographically and oceanographically. Geographically, the GCLME extends from approximately 12 degrees N latitude south to about 16 degrees S latitude, and variously from 20 degrees west to about 12 degrees East longitude. From an oceanographic sense, the GCLME extends in a north-south direction from the intense upwelling area of the Guinea Current south to the northern seasonal limit of the Benguela Oceanographic Current (Figure 2.1-1). In an east-west sense, the GCLME includes the drainage basins of the major rivers seaward to the GC front delimiting the GC from open ocean waters (a time- and space-variable boundary).

Thus, the GCLME area includes the Exclusive Economic Zones (EEZ) of sixteen countries: Angola, Benin, Cameroon, Congo, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Ghana, Equatorial Guinea, Guinea, Guinea Bissau, Liberia, Nigeria, Sao Tome & Principe, Sierra Leone and Togo. The coastal habitats in the GCLME include nearshore waters, salt marshes, mangrove swamps, estuaries, lagoons as well as other brackish bodies of water. The total length of coastline in the Region is nearly 7,600 km, including the coastline of the island State of Sao Tome & Principe and the insular regions of Equatorial Guinea (i.e., Bioko and Annobon islands). Angola has the longest coastline of approximately 1,650 km.

Table 2.1-1 shows some of the marine statistics of the region, including length of coast and area of exclusive economic zone. These areas correspond roughly to the GCLME limits.

Figure 2.1-1. Map of Western Africa Showing the Countries in the GCLME Area

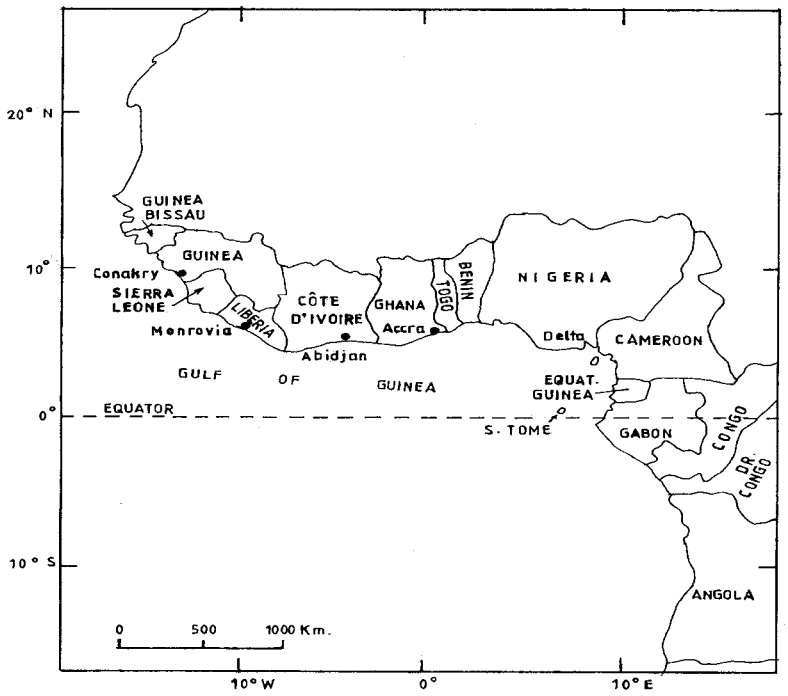


Figure 1: Map of Western Africa showing the Countries in the GCLME Area

Table 2.1-1. Continental Shelf Area and Exclusive Economic Zones of GCLME Countries

Country	Continental Shelf (km^2)	EEZ (km^2)
Guinea Bissau	45,000	156,500
Guinea	47,400	71,000
Sierra Leone	25,600	165,700
Liberia	18,400	229,700
Cote d'Ivoire	10,200	104,600
Ghana	23,700	218,100
Togo	1,300	2,100
Benin	3,100	27,100
Nigeria	46,300	210,900
Cameroon	10,600	15,400
Equatorial Guinea	14,710	283,200
DR Congo	1,150	1,000
Congo	11,300	60,000
Gabon	46,000	213,000
Sao Tome & Principe	1,459	160,000
Angola	51,000	330,000

Source: FAO, 1997 & World Resources 1994-1995

Major geomorphic features of the continental shelf include bathymetric undulations of sand ridges, canyons, gullies, dead Holocene coral banks, pockets of hard ground and rocky bottoms (Awosika and Ibe, 1998). Submarine canyons are found in some places: off the Vridi canal (Trou Sans Fond),

in Cote d'Ivoire; off west Nigeria (Avon Deep), off the Volta Delta in Ghana; off the west coast of the Niger Delta (Mahin Canyon) and off the Calabar estuary both in Nigeria (Allersma and Tilmans, 1993). The lagoons covering more than 100 km^2 include Nokoue and Porto Novo in Benin; Ebrie, Aby-Tendo-Ehy, and Grad Lahou in Cote d'Ivoire; Nkomi, Idogo, Ngobe, and Mbia in Gabon; Keta in Ghana, and Lagos and Lekki in Nigeria.

Four subsystems have been delineated in the Gulf of Guinea LME, each defined by its particular characteristics, which nevertheless contribute to the functioning of the ecosystem as a whole (Tilot and King, 1993). These include:

- Sierra Leone and Guinea Plateau: from the Bijagos Islands (Guinea Bissau) to cape Palmas (Liberia/Cote d'Ivoire). This area is characterized by the largest continental shelf in West Africa and has large riverine inputs, giving thermal stability.
- Central West African Upwelling: from Cape Palmas to Cotonou (Benin). This thermally unstable subsystem is characterized by seasonal upwelling of cold, nutrient-rich, subthermocline water, which dominates its annual cycle and drives the biology of the subsystem.
- Eastern Gulf of Guinea: from Cotonou to Cape Lopez (Gabon), including the offshore islands of Bioko and Sao Tome and Principe. This area is characterized by thermal stability and a strong picnocline. It depends on nutrient input from land drainage, river flood and turbulent diffusion for its productivity (Tilot and King, 1993; Binet and Marchal, 1993).
- Cape Lopez (Gabon) south to Angola.

2.2 Hydrology, Sedimentation and Coastal Erosion

Three narrow coastal sedimentary basins, with a few volcanic intrusions and outcrops of hard rock forming the major capes, have developed on the edges of the coastline along the Guinea Current region: from north to south, they include the Côte d'Ivoire basin, the Niger basin (Delta) and the coastal basins from Gabon to Angola (R.E. Quelennec, 1987). All along these three coastal sedimentary environments there is strong influence of the pattern of river basin drainage. Numerous small rivers and four major river systems drain the entire coast of the GCLME from Guinea Bissau to the Democratic Republic of Congo. The GCLME is one of the most endowed areas of the globe in terms of rivers. Twelve major rivers, including the Congo (Congo), Niger (Nigeria), Volta (Ghana), Wouri (Cameroon), Comoe and Bandama (Côte d'Ivoire), enter the ecosystem from an extensive network of catchment basins transporting great quantities of sediments. These twelve rivers contribute more than 92 million tons of sediment per annum into the Gulf of Guinea (Mahé, 1998; Folorunsho *et al.,* 1998). During the 1970s and 1980s, river inputs decreased in the region coinciding with the period of the sub-Saharan drought (Lamb, 1982) that resulted in reduced flows of almost all the rivers (Mahé, 1998). Land run-off is also an important source of nutrients and suspended matter to the coastal and marine environment (Table 2.1-2). Substantial quantities of nutrients originating from domestic and agricultural effluents, which are used in primary production, are carried to the sea through river outflows. Excessive nutrient loading causes eutrophication and harmful algal blooms, however. The rivers transport industrial wastes, particularly from mining and other land based activities.

Among the most important rivers draining into the GCLME are:

- the Niger, which drains an area of over 1 million km^2;
- the Volta River, with a drainage basin of 390,000 km^2 (World Bank, 1994);
- the Congo River with the second largest mean annual run-off and catchment area in the world, with freshwater run-off and sediment discharge estimated at 30-80 tons/km^2;

- Comoe River in Cote d'Ivoire.

Table 2.2-1. Sedimentological Characteristics of Rivers in some countries of the GCLME

Country	Catchment 1000 km^2	Sediment Yield T/km^2 /yr	Sediment Load 1000 t/yr	Sand Mi m^3/yr	Length of Coast km
Cote d'Ivoire					620
R. Sassasdra	79		2,900	0.28	
R. Cavally	44		5,300	0.51	
R. Bandama	97	65	7,200	0.68	
R. Comoe	110		6,700	0.64	
Total	340		22,100	2.13	
Ghana					465
R. Pra	38		2,400	0.27	
R. Volta	402		15,500	1.06	
Total	440	70	17,900	1.33	
Togo					80
R. Mono	29		1,600	0.18	
Total	29	60	1,600	0.18	
Benin					90
R. Oueme	48		2,400	0.23	
Total	48	50	2,400	0.23	
Nigeria					850
R. Ogun	47		1,100	0.1	
R. Niger	2,156		40,000	2.5	
R. Cross	60		7,500	0.7	
Total	2,263	80	48,600	3.3	

(Adapted from Per Roed J., 1989)

Most of these rivers have been dammed for energy, irrigation and flood control purposes, resulting in significant alteration of their hydrology and their sediment flow and creating inevitable downstream impacts and accelerating coastal erosion processes. The coastal basins, particularly along the Niger delta, are gradually subsiding due in part to the natural geology of the area, but also because of human activities such as oil mining and natural gas exploitation. These factors are combining to cause displacements of structures, people and economies of coastal communities and urban centres.

Coastal erosion constitutes a serious problem in many countries in the GCLME. The rate of the coastal retreat can average several meters per year (for example erosion rates caused by port structures in Liberia, Togo, Benin and Nigeria sometimes reach a staggering 15-25 m per year). Although the coastline is highly subject to natural erosion and sedimentation processes due to high wave energy, strong littoral transport, etc., erosion has been intensified by human activities, notably through sand mining and exploitation, disturbance of the hydrological cycles, river damming, port construction, dredging, mangrove deforestation, etc. Harbour construction activities have altered long shore current transport of sediments and in many cases have led to major erosion and siltation problems. Actions to control erosion around these ports are critically important to maintaining their vitality as sites for growing tourist, recreational, commercial and defence needs. These are particularly relevant for the Western part of GCLME and particularly for the countries Benin, Côte d'Ivoire, Ghana, Nigeria and Togo. Examples of coastal erosion rates in western Africa are given in UNEP (1999) as follows:

- Liberia: mean recession of 2m per year around Monrovia

- Ghana: mean recession of 6m per year west of Accra since the closing of the Akosombo dam in 1964
- Nigeria: coastal recession of approximately 500m has been recorded at Victoria Island since the construction of the Lagos Harbour in 1907 (average of 5 m/year)
- Togo and Benin: retreat rates of up to 500m have been recorded since the construction of the Lome and Cotonou ports (erosion rate of several meters per year)

Other factors affecting the GCLME coast are pollution and sea-level rise. Particularly within the Niger freshwater river basin, the existing agro- chemical and agricultural run-off, the sedimentation load and the urban and industrial waste waters have certain notable impacts on ground and surface water quality. Along the coast, the potential in terms of sea-level rise and its impacts is also great. Some effects include shoreline retreat and erosion, increased frequency of submergence of the coastal wetlands and salt-water intrusion into estuaries and coastal aquifers.

2.3 Geology and Geomorphology

The Volta, Niger and Congo basins dominate the coastal geology of the Guinea Current region. Another recognizable tectonic feature in the region is the Benue rift, parallel to the volcanic Cameroon Mountains that extend into the ocean as islands of Fernando PO, Principe, Sao Tome and Pagalu. Geomorphologically, the Guinea Current Coastal Zone consists of: (1) low-lying sandy barrier islands, behind which are a complex lagoon network that stretches from Cote d'Ivoire to the Niger Delta in Nigeria and creeks; (2) muddy coast e.g. the Mahin mud coast in Nigeria; (3) isolated pockets of cliffed and rocky coast especially around Cape Three Points in Ghana, off Senegal and Cameroon occurring as extensions of the African crayton; and (4) a narrow continental shelf. In general the continental shelf of the area is quite narrow ranging between 15 and 105 km. The widest part of the continental shelf is off Guinea. Off Abidjan in Côte d'Ivoire, the shelf is divided into two sections by a "bottomless pit" ("le trou sans fond") that extends almost to the shoreline. From here the shelf widens towards the east reaching its widest part of about 90 km off Cape Coast in Ghana. The shelf narrows again further eastwards between Tema (Ghana) and Lagos (Nigeria). Off Nigeria, the middle shelf configuration is modified by the Avon, Mahin and Calabar canyons, as well as pockets of dead Holocene coral banks (Williams, 1968; Ssentengo *et al.,* 1986; Awosika and Ibe, 1998). East of Lagos, the shelf widens to about 85 km off the Niger Delta beyond which it (the shelf) narrows to an average width of 30 – 40 km. The shelf generally breaks at depths of between 100 and 120 m (Awosika and Ibe, 1998). A belt of dead corals runs almost parallel to the coastline at a depth of between 50 and 140 m in the Guinea Current Region and submarine canyons occur at a number of locations off Côte d'Ivoire, Ghana and Nigeria.

Major geomorphic features of the Guinea Current shelf include bathymetric undulations of sand ridges, canyons, gullies, Dead Holocene coral banks, pockets of hard grounds, rocky bottom and deep seated and shallow fault structures (Awosika & Ibe, 1998). The coastal morphology of the GCLME region is a succession of:

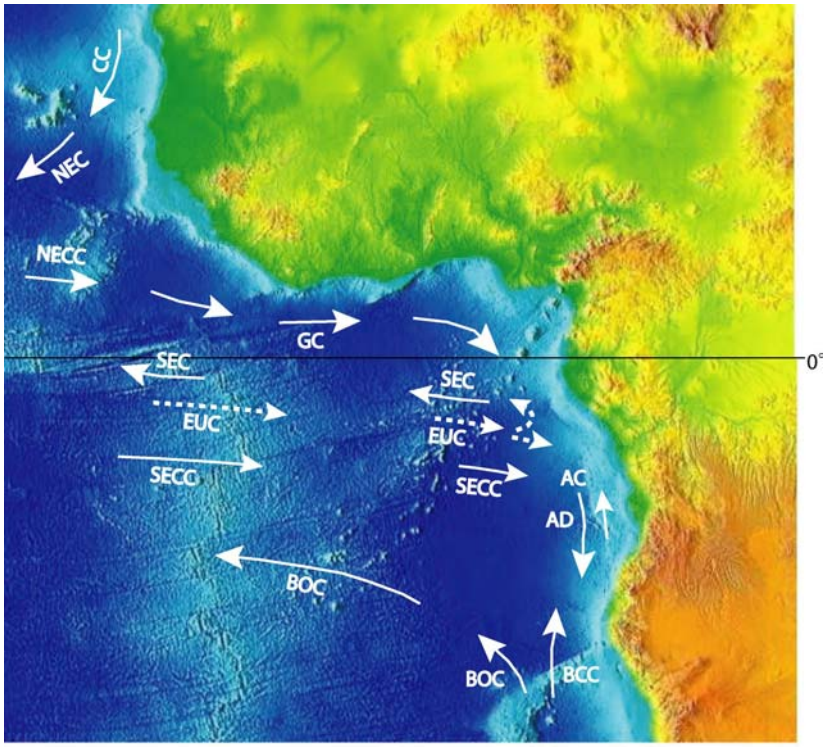
- Sandy arid coastal and plains bordered by eolian dunes (Angola);
- More or less sandy marshy alluvial with estuaries and deltas, colonized by mangrove vegetation (Guinea-Bissau and Guinea, Sierra Leone);
- Rocky scarps and sandy beaches, alternating with mangrove vegetation (Sierra Leone, Liberia, eastern Nigeria to Gabon);
- Low sandy coastal plains which alternate with lagoons along the Gulf of Guinea (Côte d'Ivoire, Ghana, Togo, Benin, Congo estuary up to the Angolan border);

- Huge marshy areas formed by the Niger delta, with mangroves indented by fluvial channels that are subject to tidal influence.
- Extensive coastal lagoons

There are also a number of islands and archipelagos in the Eastern part of the Guinea Current region: namely, Sao Tome and Principe and Annabon in Equatorial Guinea.

2.4 Oceanography

The Gulf of Guinea and adjacent areas of the eastern tropical Atlantic, bounded to the north by the Canary Current coastal upwelling region and to the south by the Benguela Current coastal upwelling region, are affected by five major basin-wide wind-driven cells of ocean circulation. These are the North Atlantic Subtropical (NAS), North Equatorial Cyclonic (NEC), Equatorial Anticyclonic (EA), and South Equatorial Cyclonic (SEC) gyres. The circulation cells are formed due to latitudinal variations in the wind stress, that is due to the existence of the subtropical anticyclones and Intertropical Convergence Zone (ITCZ), which separates the belts of the northeast and southwest trade winds. The major surface currents forming the peripheries of the gyres are the North Equatorial Current (NEC), South Equatorial Current (SEC), North Equatorial Counter Current (NECC), South Equatorial Counter Current (SECC), Guinea Current (GC), and Angola Current (Stramma and Schott, 1999). Other current systems that may affect near surface circulation in the region are the equatorward Canary Current (CC) feeding the NEC in the north and the Benguela Current (BC) feeding the SEC in the south. The NEC, SEC, NECC, and SECC are the westward and eastward cross-basin flows while the CC, GC, AC, and BC form the system of the tropical eastern boundary currents. In the seasonal course, the ITCZ migrates from its southern position in winter to its northern position in summer (Figure 2.4-1). The circulation cells in the ocean follow the ITCZ migrations with some delay.



Due to the asymmetry in the distribution of water and land in this part of the Atlantic, the ITCZ is mostly located north of the equator and cross-equatorial winds favor oceanic upwelling at the equator. The trade winds pile up warm surface water at the western coast of the Atlantic thus creating a pressure gradient that gives rise to the eastward flowing equatorial undercurrents. These are the Equatorial Undercurrent (EUC), North and South Equatorial Undercurrents (NEUC and SEUC). An analysis of physical (current velocity, temperature, salinity) and chemical (nutrient salts, dissolved oxygen, chlorofluorocarbons) parameters has shown (Bourlès et al., 2002) that the EUC is located between latitudes 2° N and 2° S, with greatest flow intensity at 100-m depth. The SEUC and NEUC are weaker underflows located near latitudes 4° N and 4° S in the 100 to 300-m depth range.

The NEC is a broad current that has a westward mean velocity between 10-15 cm/s (Richardson and Walsh, 1986). The NEC reaches peak values of 15 cm/s in boreal summer (Arnault, 1987). The mean eastward velocity for the NECC, meandering between 3 and 10°N, in the eastern part of the ocean is about 15 cm/s. This increases to speeds of more than 30 cm/s in the Guinea Current (Arnault, 1987). The greatest flow of the NECC occurs in boreal summer with eastward speeds of up to 30 cm/s that are reduced during the spring (Richardson and Walsh 1986). The Guinea Current flows east at approximately 3°N along the western coast of Africa (Henin et al. 1986). When it reaches the Gulf of Guinea, it can obtain velocities close to 100 cm/s near 5°W (Richardson and Reverdin 1987). The Angola Current is a poleward continuation of the GC. It forms the eastern periphery of a sub-basin scale cyclonic gyre, the Angola Dome (AD). The center of the gyre is on average located at 10°S, 10°E (Gordon et al., 1991). In the upper layer, the Angola current may be considered an extension of the southeastern branch of the SECC and EUC. Moroshkin et al. (1970) described the Angola Current as a stable flow over the shelf and continental slope of Angola that reaches 250-300-m depths. In general, the current is weaker during boreal summer and stronger during winter. The SEC appears in all seasons as a strong westward flow near the equator (~30 cm/s) and as a broad weaker flow further south near 10°S (10-15 cm/s). There is a great deal of variability in the equatorial ocean since the weakness (or absence) of the Coriolis parameter makes the surface flows highly susceptible to wind forcing.

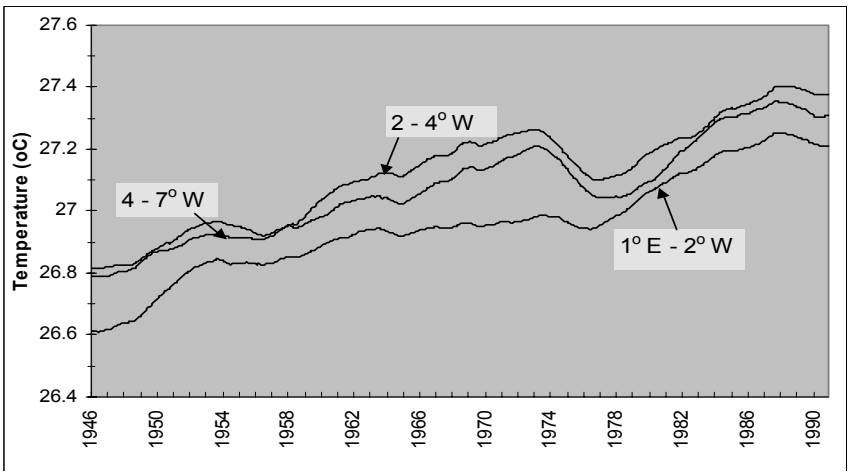
The Guinea Current is weaker during boreal winter and intensifies during the summer (Richardson and Philander, 1987). This flow, like other eastern ocean boundary currents, is characterized by areas of upwelling (Bakun 1978) and increased biological productivity (Binet 1997). The GC is a geostrophically balanced current with isotherms sloping upwards towards the coast. As the current intensifies, the slope becomes steeper bringing the thermocline closer to the surface near the coast. The coastal upwelling and the boreal summer intensification of the GC are thus related (Philander 1979).

Coastal upwelling occurs seasonally along the northern and eastern coasts of the Gulf of Guinea. The major upwelling season occurs from June to August and transient upwelling events occur also in January and February. The most remarkable characteristic of the Gulf of Guinea coastal upwelling is the absence of correlation between local wind stress and coastal temperature, at least during the boreal summer season. There is evidence of a an eastward propagation of the upwelling along the equator and then southward propagation of the signal along the coast suggesting that the seasonal shoaling of the thermocline in the Gulf of Guinea is induced by Kelvin waves (Adamec and O'Brien, 1978). This remote forcing of the upwelling is well documented and supported by numerical models and data analyses. However, local-forcing mechanisms may also play a role in modifying the remotely generated upwelling events.

The entire GCLME is highly stratified with a thin surface layer of warm fresh tropical water (25-29°C, 33-34 PSU), overlying high salinity subtropical water (19-28°, 35-36.5 PSU). An additional

contribution of saline water comes from subducted subtropical water from the North Atlantic. The lower salinities characteristic of the coastal surface water reflect excess of precipitation over evaporation in the Niger delta of Nigeria. On this shelf tropical surface water mass becomes much influenced by river discharges through the existence of a discrete plume of river discharge water. The stratification of the upper water column along the Guinea Current coast is generally strong except in areas subject to upwelling events. Sea-surface temperature trends for the region are shown in Figure 2.4-2.

Figure 2.4-2. Sea Surface Temperature Trends in the Gulf of Guinea. Three Areas Between the Coastline and Latitude 4°N and the Indicated Longitudes



Using time series analysis Koranteng (1998) showed that the trend of offshore sea surface temperature in the Gulf of Guinea (obtained from the Comprehensive Ocean Atmosphere Dataset (COADS) (Woodruff *et al.,* 1987)) exhibits a general increase since 1946 (Figure 2.4-3). The hydrographic regimes and coastal processes in the Gulf of Guinea are the major factors that determine fish stock abundance and distribution in the region (Williams, 1968; 1969; Koranteng *et al.,* 1996). For example, the abundance and distribution of small pelagic fish species are controlled mainly by the intensity of the seasonal coastal upwellings (FRU/ORSTOM, 1976; Bard and Koranteng, 1995). During the upwelling, high biological activity takes place; phytoplankton and zooplankton production rise considerably, and most fishes spawn at this time (Houghton and Mensah, 1978). The main fishing season in the area occurs during the major upwelling period (Mensah and Koranteng, 1988).

Both the Canary and Benguela currents transport cool waters towards the Equator and have current speeds of approximately 20 cm/sec (Figure 2.4-1). All the currents are essentially wind-driven. As a consequence, the upwelling phenomena, generated by the regional wind systems, dominate in bands of some tens of kilometer widths adjacent to the coast. The cool and richer upwelling waters prevail along the northwestern part from November to April/May along limited parts of the northern parts of the Gulf of Guinea, and strongly in winter along the southern coastline (August), weaker in summer (November-February) (World Bank Report, 1994). The thermal instability and intensive seasonal upwelling (around the Cote d' Ivoire-Ghana border) characterize the northern subsystem of the GCLME. The southern subsystem is generally stable depending on nutrient input originating from land drainage and river flood and oceanic turbulent diffusion, although periodic upwellings have been reported. These characteristics combine to make this area one of the world's

most productive marine areas rich in fishery resources and an important reservoir of marine biological diversity.

2.5 Important Ecosystems

The coastline of the region is generally low-lying and interspersed with marshes, lagoons and mangrove swamps. A number of estuaries interrupt the barrier beaches that separate mangrove swamps from the sea. A large variety of ecotones or habitats exist in the GCLME. Among these are:

- Wetlands habitats, where mangrove forests are the most apparent features (close to 25,000 km^2 from Guinea Bissau to Angola). The areas of highest mangrove concentration are located along the coasts of Guinea and Guinea Bissau, Sierra Leone and in the Niger delta of Nigeria. The huge marshy area formed by the Niger delta is colonised by mangroves indented by fluvial channels that are subject to tidal influence. The delta and associated wetlands of the Niger River rank among the largest mangrove forests in the world at approximately 7,415 km^2 (Scott, 1966). The wetland is made up of permanent saline creeks, inter-tidal mangrove swamps, estuaries and beach ridges. Although these mangrove forests are less diverse in terms of species than those found in East Africa, they are the best developed and most extensive in Africa (see, for example, table 2.5-1). Most of the coastal wetlands provide unique ecological conditions and habitats for migratory birds. They function also as a nursery for valuable fish and shellfish species, but remain unprotected with regards to natural and human influences and exploitation;
- Coastal lagoons, which are found mainly in the Gulf of Guinea from Côte d'Ivoire to east of Nigeria, are associated with freshwater rivers, deltas, and estuaries and include a wide range of tidal swamps and seasonal marshland. Their extent is shown in Table 2.5-1;
- Sea-grass beds which are not very well developed in the region, although there are indications of isolated patches in some estuaries and delta mouths. There are no true reefs along the GCLME coast mainly due to the cool waters of the Benguela and Canary currents;
- Sandy beaches, particularly along the Angolan coast. They are considered important nesting ecosystems, particularly for sea turtles. Their exposure to strong currents and swells make them extremely dangerous, however. These areas are often subject to marine debris and detritus accumulation.

Table 2.5-1. Marine Area, Mangrove Area, and Important Coastal Lagoons of the GCLME

Country	Marine Area (m^2)	Mangrove Area (m^2)	Lagoons	Area (km^2)
Benin	7,900	30	Nokoué Porto-Novo	139.50 17.52
Cameroon	4,500	4,860	*	*
Cote d'Ivoire	30,500	640	Ebrié Aby-Tendo-Ehy Grand Lahou	560 410 250
Equatorial Guinea	82,600	120	Volcanic crater lakes	*
Gabon	62,300	1,150	Nkomi Ndogo Ngobe Mbia	806 582 402 242

Ghana	63,600	630	Keta Sakumo-Accra Songaw Korle†	330 23.6 18
Nigeria	61,500	12,200	Lagos† Lekki	460 247
Sao Tome and Principe	600	10	*	*
Togo	37,400	*	Togo Vogan (Boko) Aneho	46.6 8 3

(In Awosika & Abe, 1998)
* No Lagoon of appreciable size; † heavily polluted lagoon

Mangrove swamps are one of the the most biologically significant coastal ecosystems in the GCLME. Mangroves, typically *Rhizophara sp, Conocarpus sp, Avicennia sp, Mitragyna inermis, Laguncularia sp*, occur almost everywhere along the coasts in the GCLME and are dominant in certain places, such as the Niger Delta of Nigeria which has Africa's largest and the world's third largest mangrove forests (Ukwe *et al.,* 2001). Wetlands and mangrove forests are major habitats in the Niger Delta of Nigeria supporting vegetation that is adapted more or less to continuous water-logging and includes marshes, sloughs and estuaries (Table 2.5-2). The estimated total area of wetlands in the Niger Delta is approximately 1,794,000 ha, consisting of 617,000 ha of saline and 1,177,000 ha of freshwater swampland (NEST, 1991). These areas serve as spawning and breeding grounds for many transboundary fish species and shrimps. Table 2.5-3 lists many of the mangrove areas in the six countries participating in the pilot phase GoGLME project.

Presently the mangrove forests in the GCLME region are under pressure from over-cutting (for fuel wood and construction timber) and from other anthropogenic impacts (e.g. pollution), thereby jeopardising their roles in the regeneration of living resources and as reservoirs of biological diversity. Results obtained during the Pilot Phase Gulf of Guinea LME Project showed that in Ghana, 55% of the mangroves and significant wetlands around the greater Accra area have been decimated through pollution and over cutting. In Benin, the figure is 45% in the Lake Nokoué area, and 33% in the Niger Delta of Nigeria. In Cameroon, 28% of the Wouri Estuary has been destroyed and in Côte d'Ivoire, about 60% of the mangroves in the Bay of Cocody have been cut (Isebor, 1999). Various human activities in the coastal countries destabilise the mangrove ecosystem, consequently affecting the health of the system and impacting negatively on the role of mangroves in the regeneration and sustenance of associated living resources and as reservoirs of biological diversity.

Table 2.5-2. The Distribution of Mangrove Vegetation in Nigeria (in Land Use Area Data of Nigeria (FAO, 1981)

Coastal State	Area of Mangrove (km^2)	Mangrove Forest Reserve (km^2)
Edo	3,470	144
Cross River and Akwa Ibom	722	57
Lagos	42	3
Ogun	12	-
Ondo	41	-
Rivers	5,436	91

Total	9,723	305

Table 2.5-3. Inventory of Mangrove and Associated Vegetation for six countries in the GCLME

Family	Species	Cote d'Ivoire	Ghana	Togo	Benin	Nigeria	Came-roon
Rhizophoraceae	*Rhizophora racemosa*	+	+	+	+	+	+
	R.. mangle		+			+	+
	R. harrisonii		+			+	+
Avicenniaceae	*Avicennia africana*	+	+	+	+	+	+
Combretaceae	*Conocarpus erectus*	+	+		+	+	+
	Laguncularia racemosa		+	+	+	+	+
Papilionaceae	*Dalbergia ecastaphyllum*	+	+		+	+	+
	Drepanocarpus lunatus	+	+	+	+	+	+
Adiantaceae	*Acrostichum aureum*	+	+	+	+	+	+
Gramineae	*Pennisetum purpureum*					+	+
	Setaria sphaecelata						+
	Hyparrhenia rufa						+
Palmaceae	*Nypa fructican*					+	+
	Raphia vinifra					+	+
	Raphia hookeri	+				+	+
Mimosaseae	*Albizzia sp*					+	+
Loganiaceae	*Anthocleista liebretchsiana*						+
	A. vogelii						+
Poaceae	*Paspalum distichum*			+			
	Paspalum vaginatum	+	+	+	+	+	
	Panicum repens						
	Echinochloa pyramidalis						
	Phylanthus muellerianus				+		
Arecaceae	*Phoenix reclinata*		+	+	+		
Ficoidaceae	*Sesuvium pertulacastrum*		+		+	+	
Malvaceae	*Hibiscus tiliaceae*	+	+			+	
Convolvulaceae	*Ipomea pes-caprae*		+			+	
	I. brasilensis				+		
	I. aquatica						
	I. stolonifera						
Portederiaceae	*Eichhornia crassipes*	+				+	+
Pandanaceae	*Pandanus candelabrum*	+				+	
Cyperaceae	*Cyperus articulatus*	+		+	+		+
	Eleocharis variegata	+		+			
	Scleria vogelii	+					
Moraceae	*Ficus ovata*	+					
	Ficus congensis	+				+	
	Ficus sp						+
Typhaceae	*Typha latifolia*					+	
	T. australis		+			+	

Sources: Cote d'ivoire:[1] Egnankwou, W. N.(1993),Sankare, Y. (1998). Ghana:[2] Sackey E. L. *et al.,*(1993), Adomako, J. (1998). Togo:[3]Akpangana, K. *et al.,*(1993) Akpagana, K. (1998). Benin - [4] Hoachimou, I (1993), Akoegninou, A. (1998). Nigeria:[5]Isebor, C. E. *et al.,*(1993), Isebor, C. (1998)
Cameroon:[6] Zogning, A (1993), Nganje M (1998)

2.6 Biodiversity

2.6.1 Flora

The GCLME coast is home to vast forest resources that are both biologically and socio-economically significant. Forest resources of the tropical coast of some states provide an important source of fuel wood, medicinal plants, food and timber for coastal inhabitants (Galega, *thematic review*). The mangrove species prevalent along the coast provide the nutritional inputs to adjacent shallow channel and bay systems that constitute the primary habitat, spawning and breeding grounds for many aquatic species of commercial importance. Mangroves of the GCLME are also a particularly important resource for coastal communities. They are used for firewood, fish smoking, building materials, salt production, oyster culture, fisheries and medicinal purposes. Unfortunately, overuse and, to a lesser extent, pollution, urbanisation and industrial growth have led to reduction of mangroves in the GCLME area. Marine flora biodiversity is less well known than the terrestrial biodiversity, due to emphasis on the terrestrial components.

Table 2.6-1 lists the higher plants by country, including total number, endemic species, and threatened species.

Table 2.6-1: List of all endemic and threatened Higher Plants

Country	All species	Endemic species	Threatened species	No. of species per 10,000 km^2
Angola	5,000	1,260	25	1,017
Benin	2,000	x	3	899
Cameroon	8,000	156	74	2,237
Congo Dem. Rep	11,000	1,100	7	1,817
Congo Rep.	4,350	1,200	3	1,356
Cote d'Ivoire	3,517	62	66	1,118
Equatorial Guinea	3,000	66	9	2,135
Gabon	6,500	x	0	2,197
Ghana	3,600	43	32	1,264
Guinea	3,000	88	35	1,043
Guinea-Bissau	1,000	12	0	655
Liberia	2,200	103	1	1,037
Nigeria	4,614	205	9	1,036
Sierra Leone	2,090	74	12	1,091
Togo	2,000	x	0	1,128
Total	61,871	4,369	276	

* Flowering plants only. Source: World resources 1998-99

2.6.2 Avian Fauna

The Gulf of Guinea is included in the West African flyway, which is the major annual bird migration route between breeding and wintering areas, including stop-over areas in between. Most of the coastal wetlands in the region provide unique ecological conditions and habitats for migratory birds, many of which come from Europe.

Among the marine and seashore birds found in the Gulf of Guinea are: Common Ringed Plover (*Charadrius hiaticula*), Knot (*Calidris canutus*), Curlew Sandpiper (*Calidris ferruginea*), Bar-tailed

God wit *(Limosa lapponica*), Cattle Egret (*Bubulcus ibis*) and the white-winged Tern (*Chlidonias leucopterus*). Also, a number of seabirds breed in the area between Guinea Bissau and Angola. This includes the gull-billed Tern (*Gelochelidon nilotica*), the Royal Tern (*Sterna maxima albididorsalis*) the White-tailed Tropicbird (*Phaeton lepturus*) and the Brown Booby (*Sula leucogaster*). It is estimated that the area between Sierra Leone and Ghana holds about 700,000 waders in winter (Smit and Piersma, 1992). A conservative estimate puts the corresponding number between Ghana and Angola at about 300,000 birds.

The main threats to the survival of both endemic and migrant birds in the Gulf of Guinea include habitat loss due to urbanization and agricultural activities, and pollution from activities connected with the oil industry. Unfortunately, some of the countries in the region (e.g., Nigeria and Cameroon) are not parties to the Convention on the Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention of 1971). Ramsar sites are delineated, protected, studied and managed.

Table 2.6-2 lists the major avian fauna by country, including the number of species, the number of threatened species and endemic species, and the density of birds.

Table 2.6-2: List of all endemic and threatened Bird species

Country	Breeding species	Endemic	Threatened	No. of species per 10,000km^2
Angola	765	13	13	156
Benin	307	0	1	138
Cameroon	690	8	14	193
Congo Dem. Rep	929	22	26	153
Congo Rep.	449	0	3	140
Cote d'Ivoire	535	0	12	170
Equatorial Guinea	273	3	4	194
Gabon	466	0	1	157
Ghana	529	1	10	186
Guinea	409	0	12	142
Guinea-Bissau	243	0	1	159
Liberia	372	1	13	168
Nigeria	681	2	9	153
Sierra Leone	466	0	12	243
Togo	391	0	1	220
Total	7,505	50	132	

Source: World resources 1998-99

2.6.3 Marine Species

The GCLME is rich in marine species including molluscs and crustaceans, small mammals such as statungas, otters, *Atilax paludinosus*, *Dasymys incomtus* and large mammals such as *Cephalophus* sp. Molluscs found in this habitat include *Crassostrea gasar* (clams), *Arca senilis* (volutes), *Cymbium pepo*, cones, cowries and conches. These molluscs form an important basis for fish and bird food chains as well as being a major food source for humans. Mangroves also harbor some species of crocodiles and the endangered West African manatee *Trichechus senegalensis*.

Four of the seven remaining species of marine turtles in the world can be found in the Gulf of Guinea where they lay their eggs at selected places along the shores (table 2.6-3). These are the

Atlantic Green *(Eretmochelys imbricata*), the Leatherback (*Dermochelys coriacea*), the Hawksbill (*Eretmochelys imbricata*), and the Olive Ridley (*Lepidochelys olivacea*). Green turtles are classified as endangered and Hawksbill turtles are classified as critically endangered (WCMC, 1996). Despite international initiatives to protect these endangered species, marine turtles are still secretly hunted for food throughout the Gulf of Guinea. Their eggs are also collected by humans and destroyed by dogs and pigs on the beaches.

Table 2.6-3. Status of Marine Turtles in the Guinea Current LME According to IUCN Red List Classification

Species	Common Name	IUCN Red List Classification
Chelonia mydas	Green turtle	Critically endangered
Caretta caretta	Loggerhead turtle	Endangered
Eretmochelys imbricata	Hawksbill turtle	Critically Endangered
Lepidochelys olivacea	Olive Ridley turtle	Endangered
Dermochelys coriacea	Leatherback turtle	Endangered

(Source: WCMC, 1996)

In some shrimp fisheries in the sub-region (e.g. in Nigeria), introduction of the turtle excluder device (TED) is being considered. This device allows turtles to escape from shrimp nets when caught.

Marine mammals that inhabit the waters of the Gulf of Guinea are mainly cetaceans (whales and dolphins) and sirenians (manatees). Of special importance are the Atlantic Humpbacked dolphin (*Sousa teuszii*) and the African manatee (*Trichecus senegalensis*). Both species appear on the IUCN Red List of endangered species; the African manatee is classified as vulnerable and the humpbacked dolphin is classified as highly endangered under CITES (Donoghue and Wheeler, 1994; WCMC, 1996). At the end of summer, toothed, fin and humpback whales migrate to the waters of the Gulf of Guinea from Antarctica (Jefferson *et al.,* 1983; Elder and Pernetta, 1991).

Table 2.6-4 lists the marine biodiversity in west and central Africa, including numbers of endemic species and total numbers of species.

Table 2.6-4: Marine Biodiversity in West and Central Africa

Flora and Fauna	No of Endemic species	Total number of species
Seagrasses	0	1
Corals	1	10
Molluscs	1	238
Shrimps and lobsters	3	47
Sharks	1	89
Seabirds	2	51
Marine mammals	2	44
Total	10	480

Source: World resources 1998-99

Table 2.6-5 shows the major fishes involved in the fisheries of the Gulf of Guinea.

Table 2.6-5. Major Groups, Families and Number of Species of the Commercially-Exploited Fin- and Shell-Fishes of the Gulf of Guinea

GROUP	FAMILY	SPECIES
Bony fishes	80	627
Sharks	11	77
Batoid fishes (sawfishes, rays & skates)	7	41
Lobsters	3	3
Shrimps & Prawns	10	17
Cephalopods	7	23
Bivalves	17	47
Gastropods	13	26
Sea turtles	2	6

Source: FAO, 1990

Table 2.6-6 lists the freshwater and marine fish species by country in the GCLME region, including the total number of species (where known) and number of threatened species.

Table 2.6-6: List of some fresh and marine fish species

Table 2.6-6: List of some fresh and marine fish species

Country	All species	Threatened
Angola	X	0
Benin	X	0
Cameroon	X	26
Congo Dem. Rep	X	1
Congo Rep.	X	0
Cote d'Ivoire	X	0
Equatorial Guinea	X	0
Gabon	X	0
Ghana	X	0
Guinea	X	0
Guinea-Bissau	X	0
Liberia	X	0
Nigeria	260	0
Sierra Leone	X	0
Togo	X	0
Total	xxx	27

Source: World resources 1998-99

2.6-4: Other species

Table 2.6-7 lists the species of mammals by country, including the number of species (including marine), the numbers of endemic and threatened species, and the density of species.

Table 2.6-7: List of all endemic and threatened Mammals

Country	All species	Endemic species	Threatened	No. of species per 10,000 km^2
Angola	276	7	17	56
Benin	188	0	9	85

Cameroon	297	13	32	83
Congo Dem. Rep	415	28	38	69
Congo Rep.	200	1	10	62
Cote d'Ivoire	230	1	16	73
Equatorial Guinea	184	3	12	131
Gabon	190	2	12	64
Ghana	222	1	13	78
Guinea	190	1	11	66
Guinea-Bissau	108	0	4	71
Liberia	193	0	11	87
Nigeria	274	6	26	62
Sierra Leone	147	0	9	77
Togo	196	1	8	110
Total	3,310	64	224	

Source: World resources 1998-99

Table 2.6-8 lists some endemic and threatened amphibians, country-by-country, in the GCLME region, including number of species (where known), endemic and threatened species, and density of species.

Table 2.6-8: List of some endemic and threatened Amphibians

Country	All species	Endemic	Threatened	No. of species per 10,000 km^2
Angola	X	22	0	x
Benin	X	0	0	0
Cameroon	X	66	1	x
Congo Dem. Rep	X	53	0	x
Congo Rep.	X	1	0	x
Cote d'Ivoire	X	3	1	x
Equatorial Guinea	X	2	1	x
Gabon	X	4	0	x
Ghana	X	4	0	x
Guinea	X	3	1	x
Guinea-Bissau	X	1	0	x
Liberia	38	4	1	17
Nigeria	>109	1	0	x
Sierra Leone	X	2	0	x
Togo	X	3	0	x
Total		169	5	

Source: World resources 1998-99

Table 2.6-9 lists the number of reptiles by country, including number of species (where known), endemic and threatened species number, plus species density.

Table 2.6-9: List of all endemic and threatened Reptilian species

Country	All species	Endemic	Threatened	No. of species per 10,000 km^2
Angola	x	18	5	x
Benin	x	1	2	x
Cameroon	x	20	3	x
Congo Dem. Rep	x	33	3	x

Congo Rep.	x	1	2	x
Cote d'Ivoire	x	3	4	x
Equatorial Guinea	x	3	2	x
Gabon	x	3	3	x
Ghana	x	1	4	x
Guinea	x	3	3	x
Guinea-Bissau	x	2	3	x
Liberia	62	2	3	28
Nigeria	>135	7	4	x
Sierra Leone	x	1	3	x
Togo	x	1	3	x
Total		99	47	

Source: World resources 1998-99

Table 2.6-9 lists the number of reptiles by country, including number of species (where known), endemic and threatened species number, plus species density.

Table 2.6-9: List of all endemic and threatened Reptilian species

Country	**All species**	**Endemic**	**Threatened**	**No. of species per 10,000 km^2**
Angola	x	18	5	x
Benin	x	1	2	x
Cameroon	x	20	3	x
Congo Dem. Rep	x	33	3	x
Congo Rep.	x	1	2	x
Cote d'Ivoire	x	3	4	x
Equatorial Guinea	x	3	2	x
Gabon	x	3	3	x
Ghana	x	1	4	x
Guinea	x	3	3	x
Guinea-Bissau	x	2	3	x
Liberia	62	2	3	28
Nigeria	>135	7	4	x
Sierra Leone	x	1	3	x
Togo	x	1	3	x
Total		99	47	

Source: World resources 1998-99

2.6.5: Protected Areas

Various protected areas exist in the region, as shown by Table 2.6-10.

Table 2.6-10 Number of Existing Marine Protected Areas in the GCLME Region

Country	Marine Areas	Coastal Areas
Angola	3	1
Cameroon	1	1
Congo	1	0
Cote d'Ivoire	3	0

Congo Democratic Republic	1	1
Equatorial Guinea	3	0
Gabon	1	1
Guinea Bissau	1	4
Total	14	8

Source: adapted from World Bank/IUCN 1995)

3.0 Socio-Economic and Development Setting

3.1 Human Development and Demography

The GCLME is a region of high ethno-cultural and social diversity. Although the region is endowed with abundant renewable and non-renewable resources, these resources have not been optimally utilized for the enhancement of the quality of life of the people (Osuntogun, *thematic review*). Instead, poverty, paucity of social infrastructure, disease and social instability are the major characteristics of this richly endowed region.

Approximately 40% of the GCLME region's 300 million people (Table 3.1-1) live in the coastal areas and are heavily dependent on the lagoons, estuaries, creeks and associated wetlands and inshore waters surrounding them (Table 3.1-2). The highest population density centres (Table 3.1-3) are located in some key cities along the coast, including Accra-Tema, Abidjan, Douala, Lagos, Port Harcourt, and Luanda. Rapid expansion of coastal populations with areas of high population concentrations have resulted from high population growth rates and movements between rural and urban areas (UNEP, 1999).

The population of the coastal areas (Tables 3.1-2 and 3.1-3) is increasing dramatically with a potential doubling time of 20-25 years at the present population growth rate of about 3%, compared to a doubling time of 100 years in developed countries. At the national level there also has been substantial population increase in the coastal cities and towns as a result of urbanization and the growth of fishing villages and landing sites. The population in the major metropolitan cities are estimated at 2 million in metropolitan Abidjan, Côte d'Ivoire; 1,6 million in Accra, Ghana; 8 million in Lagos, Nigeria; and 1,4 million in Doula, Cameroon. If developments are not planned and diversified, it is estimated that these coastal cities may grow at the alarming rate of as high as 5%.

The rapid population growth (Table 3.1-1) in the coastal zone has resulted in pollution of social values and culture, socio-economic dislocation and conflicts in addition to the serious degradation of the environment. Similar to conditions in the rest of the world, many of the region's poor are crowded in the coastal areas for subsistence socio-economic activities: fishing, farming that is largely agro-chemical-based, sand mining on the beaches, salt mining in the salt marshes and production of charcoal in the mangrove areas. Additionally, more than 60% of the existing industries in the sub-region are concentrated in the coastal cities. These industrial areas are predominantly sited in major river catchments that drain into coastal wetlands, especially mangroves, lagoons and estuaries.

In the metropolitan and urban areas, social problems include inadequate housing facilities, poor states of educational and health facilities, poor public hygiene, and high crime rate resulting from high levels of unemployment and poverty, especially among the youths. In the rural setting, inadequate educational facilities, poor health care and public utilities, and poor quality of housing constitute major problems (Osuntogun, *ibid*.). Due to political instability in many countries of the region, it has been difficult to create the institutional setting necessary for environmental management of the Gulf of Guinea as a region. Many of the states of the Gulf of Guinea are engaged in a number of regional initiatives, however.

Table 3.1-1. Profile of Biophysical, Social and Economic Indicators

	Guinea Bissau	Guinea	Sierra Leone	Liberia	Côte d'Ivoire	Ghana	Togo	Benin
Length of coastline (km)	270	346	570	579	566	550	50	125
Surface area (km^2)	36,125	245,857	72,325	96,320	322,46	238,305	56,785	112,622
Area of continental shelf (km^2)		47,400		18,400	10,200	23,700	1,300	3,100
Width of continental shelf (km)		87-104		16 - 56	20 - 35	30 - 90	21 - 32	22-32
Area of EEZ (km^2)		71,000		229,700	104,600	218,100	2,100	27,100
Population (million) (yr. In brackets)	1.175 (2000)	7.8	4.5	~3	16.9	18.0	4.3/4.8	6.2
Population growth rate (p.a.)		2.8		2.1/3.5	3.8	2.7	3.0	2.9
Population by year 2010		10.2	6.7	4.9	16.9 (1995) 27.00	27.0	6.6	9.0
Total artisanal fishers (1990)				4,400	14,200	100,000	13,000	3,200
Major coastal cities	Bissau Bafara Gabu Cantchungo	Conakry Dubreka Boffa Forécariah	Freetown Kambia Mayamba Port Loke	Monrovia Buchanan Greenville Harper	Abidjan Sassandra San Pedro	Accra Takoradi Cape Coast	Lomé Aného	Cotonou Porto Novo
Major ports		Conakry Kamsar	Freetown	Monrovia	Abidjan San-Pedro	Tema Takoradi	Lomé	Cotonou
Major Lagoon systems	Cufada Wendo-Tcham			Lake Piso Lake shepherd	Ebrié Aby-Tendo-Ehy Grand-Lahou	Keta Sakumo Songaw Korle Densu (delta)	Lac Togo Lomé	Nokoué Porto-Novo Aheme Ouidah
Area occupied by mangroves (km^2)		250,000 (ha)	213,900 (ha)			1000	10	5
Coastal erosion rate (m/y)		1.5			1.5	3	20	15 - 30
Tidal range (m)		4.10 – 4.50			1.2	1.3	1.5	1.5
Currents (m/s)		0.5 – 1.5			0.5 – 1.5	0.5 – 1.5	0.5 – 1.5	0.5 – 1.5
Major Rivers	Kayauga Koliba Cachea Cumbija	Kogon Tinguilinta Fatala Konkouré	Sewa Rokei Jong Little Scarcies	Mano St. Paul Lofa St. John Castos	Comoé Bandama Sassandra Cavally	Volta Pra Oti Tano Ankobra	Mono Zio Haho	Mono Couffo Oueme

	Nigeria	Cameroon	Equatorial Guinea	DR Congo	Congo	Gabon	Sao Tome and Principe	Angola
Length of coastline (km)	853	402	296	40	180	885	209	1,650
Surface area (km^2)	923,773	475,412	28,050	2,345,000	342,000	267,667	1,000	1,246,700
Area of continental shelf (km^2)	46,300	10,600	14,710	1,150		46,000		
Width of continental shelf (km)	15 - 85	30 – 80						
Area of EEZ (km^2)	210,900	15,400	283,200	1,000		213,000		
Population (million) (yr. in brackets)	107	14.7 (2000)	0.454 (1998)	42	2.619 (2000)	1.2	0.160 (2000)	12
Population growth rate (p.a.)	2.9	2.9		3.1	3.4	2.5	3.2	
Population by year 2010	132	20.0			3,175,000	1.4		
Total artisanal fishers (1990)	345,000	26,000		700				
Major coastal cities	Lagos Warri Sapele Port Harcourt Calabar	Douala Limbé Kribi Edea		Matadi Boma Moanda	Pointe-Noire	Libreville Port Gentil	Sao TomeCity	Luanda Lobito Benguela Namibie Soyo
Major ports	Lagos Warri Port Harcourt Calabar	Douala Limbé		Matadi Boma Banana		Libreville Port Gentil		
Major Lagoon systems	Lagos Lekki		Volcanic Crater lakes	Tonde	Conkouati Malonda	Nkomi Ndogo Ngové Banio	No lagoon of appreciable size	
Area occupied by mangroves (km^2)	12,200	2,700	120	66,000 (ha)		2500	No data	
Coastal erosion rate (m/y)	15 - 30	30 – 50						
Tidal range (m)	1.5	0.5 – 2.7						
Currents (m/s)	0.5 – 1.5	0.5 - 3						
Major Rivers	Cross Niger Benne Ogun Imo	Cross Wouri Sanaga Nyong Ntem			Kouilou Noumbi Loueme	Ogooué Nyanga Rembos Noya Komo		

Table 3.1-2. Populations in the Coastal Zone in Relation to Country Population and Area

Country	Country pop. 1994 (millions)	Coastal pop. 1994 (millions)	Coastal pop. As % of country pop.	Country area (km^2)	Coastal area (km^2)	Coastal area as % of country area
Angola	11.53	2.89	25.07%	1,245,828	95,410	7.66%
Benin	5.18	1.86	35.91%	116,266	7,248	6.23%
Cameroon	13.22	1.57	11.88%	465,425	29,378	6.31%
Congo	2.32	0.35	15.09%	345,196	11,538	3.34%
Cote d'Ivoire	13.5	3.74	27.7%	322,770	32,843	10.18%
Equatorial Guinea	0.39	0.21	53.85%	27,207	13,414	49.30%
Gabon	1.56	0.65	41.67%	261,764	53,060	20.27%
Ghana	16.7	5.47	32.75%	239,312	27,644	11.55%
Guinea	6.24	1.35	21.63%	245,156	25,175	10.2%
Guinea Bissau	1.09	0.87	79.82%	33,101	22,351	67.52%
Liberia	2.9	1.3	44.83%	96,826	31,477	32.51%
Nigeria	97.23	19.29	19.84%	913,612	65,880	7.21%
Sao Tome and Principe	0.13	0.13	100.00%	856	856	100.00%
Sierra Leone	4.55	2.15	47.25%	71,706	25,802	35.98%
Togo	4.05	1.37	33.83%	57,334	4,570	7.97%

Source: Africa: A Framework for ICZM, 1996

Table 3.1-3. Land Area and Population Density of Coastal States in Nigeria-1992 Census

STATE	1992 CENSUS	AREA (sq. km)	DENSITY (head/ km^2
DELTA/EDO	4,730,029	35,500	133
CROSS RIVER/AKWA IBOM	4,225,340	27,237	155
LAGOS	5,685,781	3,345	1,700
OGUN	2,338,570	16,762	140
ONDO	3,884,485	20,959	185
RIVERS/BAYELSA	3,983,857	21,850	182

Source: Coastal Profile of Nigeria, 1997

3.2 Regional Economic Characteristics

The regional economy of the GCLME is overwhelmingly characterized by poverty. Country Poverty Reduction Strategies Papers (PRSP) facilitated by the World Bank show clearly that in spite of improvements in economic growth over the years, poverty has been on the increase in most of the countries of the GCLME. For instance, as many as 67 million Nigerians live below the poverty line. The incidence of poverty in Nigeria increased from 27.2% in 1980 to 46.3% in 1985 and 65.5% in 1996. The impact of the above is that the Human Development Index (HDI) for Nigeria has remained low (0.391 in 1998, and 0.439 in 2000 putting the country at the 151st position among 174 countries).

Poverty persists in the region mainly because of a host of factors including inadequate access to the means for supporting rural development, destruction of natural resources and massive corruption of the public sector. There are major linkages between environment and poverty which threaten the health, livelihood and security of the poor. As a result, life expectancy is still only approximately 53 years. The indicators of childhood survival are some of the worst in the world: infant mortality rate (IMR) of 91 and under five mortality rate (U5MR) of 191 deaths per 1000 births, respectively, which are largely caused by preventable diseases. Lack of proper prevention also has lead to extremely high rates of sexually transmitted diseases. In 1997, Nigeria had 2,200,000 people living with HIV/AIDS, which was 4.12% of the population.

The widespread poverty persists in part due to environmental linkages and socio-political issues. The environment-poverty linkages in the region are indeed widespread and include forest destruction, land degradation, desertification, biodiversity loss, tropical storms, drought, pollution, erosion, flooding, windstorms, landslides and climate change impacts. Other issues of importance include losing control of the process of governance because of prolonged military rule, ethnic conflicts over resource control and religious differences, and the marginalization of women.

3.3 Industries Impacting and Impacted by the GCLME

3.3.1 Fisheries

The rich living marine resources of the GCLME are providing livelihood and employment for thousands of fishers and foreign exchange for the countries, thus providing food security for the region. The wealth of estuaries, deltas, coastal lagoons and the nutrient rich upwelling cold waters make a major contribution to the diversity of fish life in the GCLME region with an estimated 239 fish species.

The main fisheries resources exploited in each of these zones are Small Coastal Pelagics, Large Offshore Pelagics, Demersal Fin Fish Stocks, Shrimp Fishery and Molluscs. The small pelagics consist of

a) Clupeidae principally Sardinella aurita, round sardinella ; Sardinella maderensis, flat sardinella ; and Ethmalosa fimbriata, bonga;
b) Carangidae including Caranx rhoncus, yellow horse mackerel; and Trachurus trachurus, horse mackerel;
c) Scombridae especially Scomber japonicus, Spanish mackerel; and
d) Engraulididae represented by Engraulis encrasicolus, anchovy.

ii) Large offshore pelagics on the other hand are essentially the tuna fish stocks represented by
- Thunnidae mainly Katsuwonus pelamis, skipjack Thunnus albacares, yellowfin tuna, and tuna like fishes.

iii) Demersal fin fishes consist of an inshore component dominated by the Sciaenid Community principally

(a) Sciaenidae
Pseudotolithus elongatus, estuarine croaker; Pseudotolithus senegalensis, short croaker; and Pseudotolithus typus, long croaker;

(b) Pomadasyidae
Pomadasys jubiline, grunt;
Pomadasys suillus, grunt and

(c) Polynemidae
Polydactylus quadrifilis, shinynose ; and
Galeoides decadactylus, thread fin..

The deeper water component of demersal fin ishes is represented by the Sparid Community particularly

Pagellus bellotti, sea bream; and
Sparus caeruleosticus, porgies;

iv) The shrimp fishery in the GCLME area exploits Inshore penaeids especially Penaeus notialis, pink shrimp; and Parapeneopsis atlantica, brown shrimp. Offshore penaeids, on the other hand, consist of Parapenaeus longirostris, deep water rose shrimp.

(v) Molluscs, consisting of squids, cuttlefish and octopus are still an emerging fishery highly localised.

The food needs of the region are met in large part by the coastal fisheries (Tables 3.3-1 and 3.3-2), particularly for coastal populations. The per capita supply of fish in the region ranges from 6 to 50 kg/year, and most catch is used locally.

In addition to the artesinal and national industrial fisheries, a number of countries negotiate fishing rights agreements with non-coastal countries. There is little capacity in the nations of the region to effectively monitor and enforce those agreements. It is believed by some regional exerts that some of the fish caught in the region by the distant water fleets are imported to the region. In addition there are vessels which fly flags of convenience and some of these are believed to fish undetected by enforcement officials in the region creating additional stress on the fishery resources.

Table 3.3-1. Food Balance Sheet of Fish and Fishery Products in Live Weight and Fish Contribution to Protein Supply (1995-2000 AVG)

	A	B	C	D	E	F	G
YEAR	**FISHERIES PRODUCTION**	**NON-FOOD USES**	**IMPORTS OF FISH**	**EXPORTS OF FISH**	**TOTAL FISH SUPPLY**	**POPULATION**	**PER CAPITA SUPPLY**
	(tonnes in live weight)					**(thousand)**	**(kilogram)**
Benin	40,873	0	8,333	682	48,524	5,880	8.3
Cameroon	103,968	0	72,586	1,192	175,362	14,075	12,5
Congo Dem. Rep.	180,311	0	113,439	87	293,662	47,859	6.1
Congo Rep.	44,723	0	17,709	645	61,791	2,807	22.0
Cote d'Ivoire	74,369	35,200	267,694	117,201	189,661	15,201	12.5
Gabon	47,298	0	9,685	2,028	54,987	1,154	47.7
Ghana	444,576	0	158,389	70,059	532,905	18,300	29.1
Guinea	73,710	0	22,969	8,340	88,339	7,772	11.4
Nigeria	427,291	7	503,494	3,717	927,061	106,487	8.7
Sierra Leone	67,030	0	2,502	12,059	57,497	4,194	13.7
Togo	17,297	0	43,545	3,794	57,053	4,177	13.7

NOTES: Production, trade and supply data refer to fish, crustaceans and molluscs, including all aquatic organisms except whales and seaweeds. Information on changes in stocks is available for a limited number of countries only. In view of possible distortions in each components of the commodity balances (i.e. in data for catch, trade and population) as well as in coefficients used to convert product weight to live weight equivalent, per capita consumption data should be regarded as giving only an order of magnitude indication of consumption levels. Comparision with data for previous periods published in earlier FAO Yearbooks may not, therefore, give a valid indication of real changes in consumption.

NOTE: $E = A + C - B - D$

$G = E/F$

Source: CIFA 2002: Working Paper 12 for CIFA 12 Session (CIFA= Committee for Inland Fisheries of Africa)

Table 3.3-2. Fish Consumption and Percentage Contribution of Fish in Relation to Animal Protein (1990)

Countries	Fish Consumption (kg/h/yr)	% Fish contribution in relation to animal protein (1990)
Cote d'Ivoire	13,8	36,1
Ghana	27,1	63,9
Togo	14,4	45,3
Benin	9,7	27,8
Nigeria	8,4	35,3
Cameroon	12,6	28,7
Equatorial Guinea	19,1	61,0
Gabon	28,2	37,4
Sao Tome et Principe	35,1	79,1

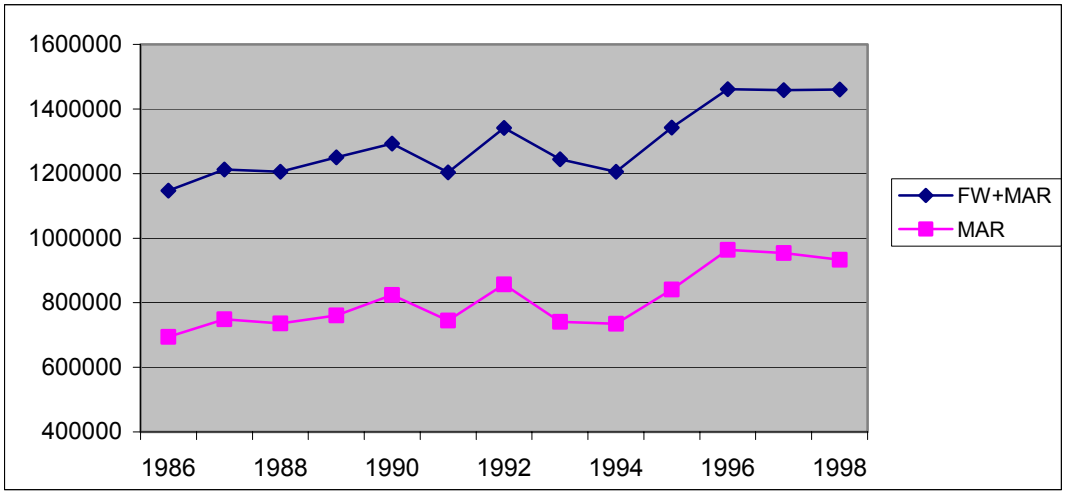
Congo	33,4	63,1
Democratic Republic of Congo	7,8	34,4

Source FAO: In Njock, (1998)

Between 1986 and 1998, the annual catch of both marine and inland species by local fleets of all 16 countries in the GCLME area ranged between 1.147 and 1.462 million metric tons (Table 3.3-3, Figure 3.3-1; FAO, 2000). The marine fish catch was between 694,000 and 864,000 metric tons. The figures show an increasing trend in fish catches with occasional decline. Fishery products exported out of the sub-region over the period were between 40,000 and 103,000 metric tons, representing 2.6 – 7.1 % of the total production and worth between 45 and 173 million US dollars (FAO, 2000.). This percentage is higher if only fish caught in marine waters are considered. At the same time, the countries of the sub-region also imported 611,000 – 952,000 metric tons of fish (mainly pelagic species) worth between 376 and 595 million US dollars (FAO, 2000). The export and import quantities are depicted in Table 3.3-1. The table shows that any possible contamination of fishery products in the Guinea Current system is sure to be a transboundary issue with the effects reaching Europe, America and other parts of Africa. It is important to note also that in an area endowed with rich fishery resources, the countries are net importers of fish. In addition, the countries also import large quantities of canned fish and fish products.

The most significant changes in the abundance of fish species in the Gulf of Guinea are fluctuations in sardinella species, dramatic increase in the abundance of triggerfish (*Balistes capriscus*) between 1973 and 1988 and the decline of the species since 1989. This has been described as one of the most phenomenal episodes in the history of fish population dynamics. In the survey conducted under the GOG-LME pilot project (Table 3.3-3), the bivalve species (*Chlamys opercularis*, Pectinidae) was caught in such large quantities never before recorded in the Gulf of Guinea. It has been suggested that the bivalve species may have been introduced into the region through ballast water.

Figure 3.3-1. Total Fish Production in Home Waters by Countries in the GCLME Region



Declines in Catch per Unit Effort (CPUE) indicate that catch is exceeding sustainable yields in some resources (Ajyyi, 1994) while species diversity and average body total lengths of the most

important fish assemblages have declined (FAO 2000) These conclusions were agreed by the experts in CECAF. These declines have led to unsustainable destructive fishing methods such as blasting and use of very small mesh nets. In 1994 the Working Group Meeting at Centre National des Sciences Halieutique de Boussoura, Conakry Guinea estimated area biomass declines in demersal species such as croackers and sicklefish was higher than 50% indcative of overfishing and related to increases in fishing effort by artisanal and industrial fishing. Trawl surveys off Ghana conducted by the Fisheries Research and Utilization Banch of the Ghana Dpartment of fisheries found that between 1985 and 1990 the estimated biomass in waters less than 20 m declined fom 122,000 to 49,000 t in the rainy season and from 72,000 to 48,000 t in the dry season and related that to increases in trawling effort. Again the magnitude of the declines are indicative of over fishing. Recently biomass estimates of Sciaidae and Sparidae were estimated by hydroacoustic surveys for the Congo and Gabon to be 38,000 t and were considered close to or fully exploited.

Changes in biodiversity of species in the Gulf of Guinea have been attributed to both natural (intensification of the minor upwelling, and water temperature changes) increase in salinity of shelf waters (Binet, 1995) and changes in meteorological and other oceanographic conditions (reduction of rainfall, acceleration of winds and alteration of current patterns (Binet, 1995)) and changes in nearshore biophysical processes. Environmental changes manifesting a periodic variability in coastal upwelling intensities are also playing a role in coastal pelagic fish abundance fluctuations.

Table 3.3-3. Mean Catch Rate (kg/hr) and Percentage Contribution at Indicated Depth Ranges
0 – 20 m

Group	Cote d'Ivoire	Ghana	Togo-Benin	Nigeria	Cameroon
Fish	132.75	22.00	80.09	140.37	108.81
Crustaceans	3.78	0.01	10.53	16.86	16.54
Molluscs	8.08	134.73	4.53	0.96	1.28
Total	144.60	156.74	95.16	158.18	126.62

21 – 40 m

Group	Cote d'Ivoire	Ghana	Togo-Benin	Nigeria	Cameroon
Fish	162.45	52.93	82.61	153.66	58.15
Crustaceans	3.85	2.56	0.08	18.92	11.37
Molluscs	7.30	95.68	13.50	5.68	2.71
Total	173.60	151.16	96.18	178.26	72.23

41 – 60 m

Group	Cote d'Ivoire	Ghana	Togo-Benin	Nigeria	Cameroon
Fish	273.40	234.81	58.90	141.15	35.60
Crustaceans	1.34	0.49	0.63	9.60	8.30
Molluscs	8.10	8.86	5.10	19.12	2.33
Total	282.84	244.16	64.63	169.87	46.23

Source: *F.T. Susainah* survey, 1999

Table 3.3-4. Mean Catch Rate (kg/hr) and Percentage Composition (all species included)

Depth	C. Ivoire		Ghana		Togo – Benin		Nigeria		Cameroon	
(m)	weight	%	weight	%	weight	%	weight	%	weight	%
0 - 20	144.6	24.1	156.7	28.4	95.2	37.2	158.2	31.2	126.6	51.7
21 - 40	173.6	28.9	151.2	27.4	96.2	37.6	178.3	35.2	72.2	29.5
41 - 60	282.8	47.1	244.2	44.2	64.6	25.3	169.9	33.6	46.2	18.9
Total	601.0	100.0	552.1	100.0	256.0	100.0	506.3	100.0	245.1	100.0

Artisanal fisheries

Fishing in coastal lagoons, estuaries and creeks is an important economic activity in the region. The fishery is mainly artisanal but rather complex in terms of fishing gears and methods used. The most popular fishing gears and methods found are: castnet, seine (or drag) nets, various traps, acadja (or brush park fishing), hand fishing, hook and line, and trawl nets (Koranteng *et. al.,* 1998). The dragnets disturb benthic organisms in the lagoons and have adverse effects on the functioning of the lagoon ecosystem. The black-chin tilapia (*Sarotherodon melanotheron*) is the most dominant species, but some other freshwater fishes (e.g. *Tilapia zillii, Clarias* spp) and marine fishes (e.g. *Ethmalosa fimbriata*, *Scyacium micrurum (*sole*)*, *Liza falcipinnis* (mullets) are caught in the lagoons, however. Some marine species such as *Lutjanus fulgens* (snapper)*, Caranx hippos,* and *Epinephelus aeneus* (groupers) also make short incursions into the lagoon. FAO estimated (1977) that 60% of the catch in the region came from artisanal fisheries.

In Equatorial Guinea, the artisanal fishery caught an annual 1500 tons (FAO 1970) or 2000 tons (Lagoin and Salmon, 1967a) prior to 1970. Catch levels in the 1980s were closer to 1000 tons. In Sao Tome and Principe, artisanal fish catch was on the order of 1800 tons in 1967 and 1500 tons in 1979 (SCET, 1980c), consisting mainly of pelagics. Van der Knaap (1985) estimated the total maximum potential yield of the inshore artisanal fisheries of Nigeria to be 100,000 tons on the basis of comparative figures from similar neighbouring and highly productive coastal systems. Table 3.3-2 below summarizes the trawling surveys carried out in Nigerian and Cameroonian waters (Vander Knaap, 1985

Pollution from land-based sources such as agrochemicals and the use of harmful fishing methods have been identified as factors that adversely affect fishery resources in coastal lagoons and estuaries. Throughout West Africa, utilization and management of fishery resources in coastal lagoons and estuaries are also linked to taboos and other cultural practices (Koranteng, *et al.,* 1998; Entsua-Mensah *et al.,* 1999).

Commercial/Industrial Fisheries

The rich fishery resources of the region are both locally important resident stocks supporting artisanal fisheries, and transboundary straddling and migratory stocks that have attracted large commercial offshore foreign fishing fleets from the European Union, Eastern Europe, Korea and Japan. In Cameroon for instance, the demersal fish and shrimp stocks have been exploited since 1951 by the industrial fleet whose number increased from 1 in 1951 to 39 in 1979 (Laure, 1969, 1972; FAO, 1987). In Nigeria, the number of inshore trawlers increased from 13 in 1971 to 29 in 1976 and 52 in 1983 (FAO, 1987). The 1976 survey performed by the FAO/USSR vessel FIOLENT estimated the commercial demersal fish stocks for the surveyed area off the coast of

Nigeria to be 28,600 tons (Roberston, 1977). FAO (1996) has estimated the total potential fisheries yield of the entire region as 7.8 million tonnes per year. The unrestricted activities of global industrialized fisheries are encroaching on the artisanal fisheries of the GCLME, however, placing at risk food security and economic returns from fisheries for the people of the region (UNIDO, 2002). FAO (1987) data shows that in Cameroon, total fresh fish landings of the industrial fleet in the period 1970-1982 fluctuated between 15,736 tons (1974); 20,397 tons (1976); 14,230 tons (1983) and 12,457 tons (1984). Shrimp landings increased from 942 tons (1970) to 2360 tons (1972), and then decreased again to 1696 tons in 1975. Catches went up to 2438 tons in 1977 and dropped dramatically to 268 tons in 1980 to increase again to 859 tons in 1987.

Demersal fish are the target species in the GCLME mostly: *Pseudotolithus typhus* and *P. elongates* (sciaenidae). Recent effort has resulted in decreased landings. It is estimated that there are around 50 and 400 industrial trawl vessels in Cameroon and Nigeria respectively. The waters of the GCLME hold a significant number of commercially important fish species and commonly known invertebrates (Armah & Nyarko, 1998). According to FAO (1990), the fish diversity in the GCLME is reasonably well documented.

Penaeid shrimps, which are major exports of the region, are amphibiotic – juveniles in the lagoons and adults at sea. Estuaries and their organic load are primary ecological factors in successful recruitment to adult stocks. Closures of lagoon and river mouths have compromised some fisheries but a regional survey documenting extend has not been made. Damages to mangroves in the nursery areas have undoubtedly impacted shrimp production. Size at juvenile emigration from the lagoons varies from to year and predictability is need to manage optimally to prevent growth overfishing in all cases and recruitment overfishing when effort is high. Shrimp bycatch is receiving attention around the world as the mortalities of small fish in the shrimp can have a strong negative impact on the adult spawning biomass. The impact of bycatch on the ecosystem is understood only qualitatively but experience from other regions leads to the conclusion the impact is particularly hard on the resources harvested by the artisanal fishers.

Regional working groups looking at the shrimp fisheries off Sierra Leone estimated that catch of southern pink shrimp fell within the MSY estimates of between 2,600 and 3,2500 t; however the reduced catches recently and declining catch per unit effort raises overfishing concerns. Likewise, regional experts considered the shrimp stocks in the western and central Gulf of Guinea to be overexploited with an estimated catch of 4,700 t.

Recreational fisheries

Recreational fishing is poorly developed in the region in contrast to the Canary Current area, where big game fishing attracts dedicated tourist dollars from trophy fishermen.. There is some potential for similar development in the GCLME. In addition with increasing tourism to the region there is a role for recreational fishing industry for less trophy species to be part of a total tourism experience. Thus recreational fisheries can be a component of tourism economic development and alternative employment for fishermen.

Mariculture

Mariculture is not heavily developed in the region (although freshwater aquaculture has a lengthy history) but has attracted considerable interest from policy makers. In response to this for example Ghana has instigated mariculture studies in the Volta Delta region. Mariculture holds out the hope of alternative sources to supplement food supplies from wild harvest. It also holds the possibility of generating foreign exchange when high value species such as shrimp are raised. The political

interest may well cause mariculture efforts to increase before there is a proper understanding of the environmental damage it can cause by such activities as habitat destruction and introduction of disease organisms into wild populations. The policy infrastructure to assure proper development is lacking. Likewise the economic failures of premature development can retard eventual utilization of aquaculture responsibly and effectively.

3.3.2 Tourism

Tourism constitutes an important industry in many West African coastal countries including Côte d'Ivoire, the Gambia, Ghana, Guinea and Guinea-Bissau. Tourism has had a severe impact along the coast from Dakar to Douala, however. The construction of hotels and other recreational facilities located directly on the shoreline has been responsible for the clearing of coastal vegetation, the filling of wetlands and the increasing load of sewage and solid waste in coastal waters.

The demand for high quality fishery products and ornamental species by the tourism industry has contributed to the overexploitation of lagoon and coastal resources. Degradation of the environment from marine debris is also attributed in part to the tourism industry.

3.3.3 Manufacturing

Even though the level of industrial development is still low in West and Central Africa, the rate of industrialization is increasing along the coastal areas. About 60% of the industries in countries bordering the Gulf of Guinea are located in coastal cities (UNDP/GEF, 1993). Industries range from textile, leather, food and beverage processing to oil and gas and mineral exploitation. These industries discharge untreated effluents directly into coastal waters or into rivers and streams that eventually empty into the coastal waters. This practice impacts negatively on the coastal ecosystem and has resulted in the deterioration of some coastal lagoons (e.g., Korle and Chemu lagoons in Ghana).

3.3.4 Agriculture

Agriculture is an applied science concerned in the improvement, production, harvesting storing and marketing of food crops, fibres, and animals for human consumption, clothing and shelter and other uses. It is also involved in protecting crops, forest trees and domesticated animals from pests, diseases and weed competition. It also improves agricultural soils texture, maintains soil nutrient levels and monitor the agroclimate of farm areas.

Agriculture is the mainstay and the economic backbone of non-oil producing countries in the GCLME areas. Even Nigeria, Cameroon and Gabon in the GCLME area that produce oil, have realized that they cannot put all their eggs in oil basket. Unfortunately agriculture (arable and pastoral) in the GCLME countries is not mechanized. They still practice peasant farming for substient living. These areas cannot be mechanized due to high, dense, forest vegetation and the mashy, swampy, nature of the soil. In addition erosion and oil exploration and production activities in the oil producing countries have affected the little farmlands in these areas and have polluted the soils with effluent discharges, drilling cuttings, muds and oil spills. Fishing and fishery activities which are the main agriculture of the GCLME areas are not left out. Fish production in these areas are adversely hampered by two main causes: natural and man-made causes that pollute the coastal waters . The natural causes include: natural coastal erosion, high wave energy and strong littoral movement, while man-made causes include oil exploration and production activities, oil spillage, dredging canalization, river damming, and mangrove deforestation. The fishing ports and their

breeding niches are destroyed by these causes. Also effluent discharges from mining companies, agrochemical and fertilizer companies, hospitals adversely affect the fishes and the food chain. Urban solid wastes (domestic and office wastes) are sometimes dumped into the coastal waters leading to algae boom which affect phyto-and Zoo planktons production as well as the fishes.

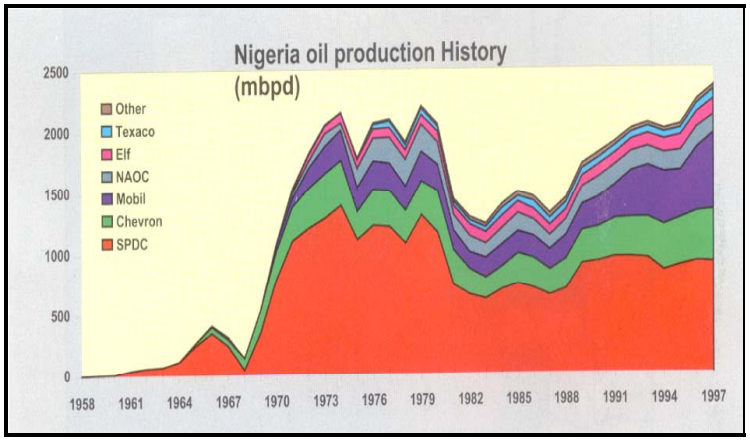
There is great need to encourage fish farmers in the GCLME areas. This can be done by establishing fish ponds in various locations in each country, and by establishing aquacultures in suitable areas where finger-limps can be raised. For food crops such as rice, maize, cassava, water yams, bananas and plantains that can be grown in these areas, flood-oil-,salt-resistant varieties can be breed for planting in these areas. These can be very promising. Agriculture is geared to sustainable human resources.

3.3.5 Oil and Gas

Nigeria is the largest oil producing country in the Guinea Current Large Marine Ecosystem (GCLME) area. Cameroon and Gabon are the other countries that produce oil in the GCLME area. The first commercial oil was found by Shell in 1956 in Olobiri in present day Bayelsa State. This was after about 50 years of oil exploration activities in the South Western Nigeria. Since then other oil companies including Mobil, Texaco, Chevron, Agip, Esso and Elf have joined Shell Petroleum Development Company (SPDC) of Nigeria in the oil hunt, exploration and production. In 1963, the first offshore oil was discovered by Gulf, Mobil and Texaco. This rapidly expanded Nigerian oil activities in the Niger Delta.

Today the Federal Ministry of Petroleum Resources acts as police dog in the oil industry. Federal Government of Nigeria participation in the oil industry stands at 55% in Shell and 60% in Chevron, Mobil, Agip, Elf and Texaco. In 1977, the Nigerian National Petroleum Corporation (NNPC) was formed through the merger of the Ministry of Petroleum Resources and the Nigerian National Oil Corporation to participate in joint venture operations among the oil Companies. The Corporation was given powers and operational interest in refining, petrochemicals and products, transportation and marketing. It is also involved in the exploration and production activities in the offshore Niger Delta.

Figure 5.3-3. Nigeria Oil production History



Source: Discover a New Nigeria 2000

In the past decade (early 1990s) the importance of gas was recognized by the Federal Government of Nigeria and the Oil Companies. The mandate is to stop gas flaring by the year 2008. Gas gathering is taking place in all the operational flow stations. The Nigerian Natural Liquified Gas (NNLG) has been formed to take care of gas gathering, storing and marketing Oil Companies with Shell in the lead are working in collaboration with NNLG. The terminal point of gas gathering is Bonny terminal.

Unfortunately oil and gas exploration and production in the Niger Delta have turned out to be a cause to the inhabitants than a blessing. The inhabitants lost their occupation (farming and fishing) due the destructive exploration and production activities of the oil companies on their farms, vegetation and fisheries. Most of the important flora (Mangroves) and fishes are becoming extinct or depleted. Oil spillages due to natural and human causes have rendered their farmlands infertile and their waters unfit for drinking and for fishing activities. These sad environmental conditions (impact) have triggered conflicts and wars in recent years in many of the oil producing areas.

Other countries are also involved in oil and gas activities (table 3.3-5). Cameroon produces about 6.25 million tons of crude oil per annum in Rio Del Rey Basin in the Nigeria Delta. Cameroon also has natural gas, which has not been tapped. Similar environmental problems being checked and managed in the oil producing States by the Federal Government of Nigeria and the Oil Companies may also be the experiences in Cameroon and Gabon if not checked and managed on time.

Oil and gas, though found in only a few countries in the region, constitute probably the most important coastal resource in the region. Some of the countries in the region are oil producers and a few (e.g. Cameroon, Gabon and Nigeria) are net exporters. In 1990, production from oil from the coastal zone of Nigeria averaged 1,800,000 barrels per day. The proven reserve base of crude oil in Nigeria is about 18 billion barrels in 1990 rising to about 30 billion in 2002. Other countries with oil and gas reserves include Cameroon with about 65 million metric tons of crude oil, Cote d'Ivoire with 15 billion cubic metres of crude oil. Crude oil has recently been found in economic quantities in Equatorial Guinea and Sao Tome and Principe (e.g., Table 3.3-5).

Table 3.3-5. Oil and Gas Reserves of Some Countries in the GCLME Region

Country	Crude Oil (1992) thousand tonnes	Natural Gas (1992) million tonnes
Benin	117	10
Cameroon	65	95
Cote d'Ivoire	3	100
Equatorial Guinea	1	3
Gabon	190	11
Nigeria	2,040	3,398

Source: World Resources 1994-95

3.3.6 Salt Production

Salt production is an important industry in the Gulf of Guinea, especially in the area between Côte d'Ivoire and Benin. Large quantities of salt are produced around coastal lagoons. In Ghana, for example, large-scale commercial salt mining is an important economic activity in coastal wetlands.

Vast areas of mangroves are cleared to make way for saltpans. This activity has been identified as one of the factors threatening the mangrove ecosystem in the region.

The salt that is produced in the coastal area is exported to other areas in the region as well as areas far from it, e.g., in the Sahelian countries.

3.3.7 Sand Extraction

Direct removal of sand from beaches for the construction industry is a common practice in the sub-region even though this is illegal in some countries (e.g. Ghana). Sand mining aggravates coastal erosion problems.

4.0 Policy, Legal, Regulatory and Institutional Setting

The Abidjan Convention defines environmental protection of the GCLME predominantly for Co-operation in the Protection, Management and Development of the Marine and Coastal Environment of the West and Central African Region adopted in March 1981. The Abidjan Convention and its Protocol on Cooperation in Combating Pollution in Cases of Emergency constitute the legal components of the West and Central African (WACAF) Action Plan. The Convention expresses the decision of the WACAF Region (from Mauritania to Angola at the time of adoption) to deal individually and jointly with common marine and coastal environmental problems. The Convention also provides an important framework through which national policy makers and resource managers can implement national control measures in the protection and development of the marine and coastal environment of the WACAF Region. The Emergency Protocol was designed to assist in the operational response to massive pollution loadings, primarily from accidental marine oil and chemical spills.

At its first meeting (Abidjan, 20-22 July, 1981), the newly constituted Steering Committee of the Convention defined the following priorities:

- Development of oil spill contingency plans;
- Combating coastal erosion;
- Prevention, monitoring and control of marine pollution;
- Rational development of coastal zones;
- Capacity building, particularly in the areas of documentation and legislation on coastal and marine management.

Since its entry into force in August 1984, Parties to the Abidjan Convention have, with UNEP's assistance, undertaken a number of activities including:

- development of programmes for marine pollution prevention, monitoring and control in cooperation with IMO, FAO, UNIDO, IOC-UNESCO, WHO, IAEA, etc.
- development of programmes for monitoring, controlling and combating coastal erosion in cooperation with UNESCO and UNDESA
- development of national environmental impact assessment programmes for particular coastal sites
- development of national environmental legislation in cooperation with FAO and IMO

As originally envisaged in the provisions of the Convention, the WACAF Regional Coordination Unit (RCU) was to co-ordinate the implementation of the West and Central African Action Plan and ensure the most efficient use of the regional sea through concerted actions by Member States

and the optimal utilisation of their shared living resources. It was to co-ordinate regional (as opposed to national) development of the coastal and marine environment and to assist in the prevention and resolution of disputes that might arise between and among the Parties to the Convention. Lack of resources for the RCU has adversely affected the implementation of the above-mentioned projects, however.

Most of the countries of the region have also ratified several international and regional Conventions relating to the coastal and marine environment such as the International Convention on Civil Liability for Oil Pollution and MARPOL 73/78 (Also, *thematic review*) (see Annex I for a full listing of the pertinent Conventions).

There is an encouraging history of co-operation between the countries bordering the GCLME even if the results, outputs and impacts have been variable. Examples of collaborative activities under the Abidjan Convention include "Control of Coastal Erosion in West and Central Africa (WACAF/3)", "Manual on Methodologies for Monitoring Coastal Erosion in West and Central Africa (WACAF/6)", "Assessment and Control of Pollution in the Coastal and Marine Environment of West and Central Africa (WACAF/2 phases I and II)", and more recently WACAF/11 on "Integrated Watersheds and Coastal Area Management Planning and Development in West and Central African Region". The countries in the GCLME sub-region also participated in the continent-wide but far from successful UNDP/UNESCO Regional Project (RAF/87/038) on Training and Research for the Integrated Development of African Coastal Systems (COMARAF) and have experience of joint programming in the context of the Fishery Committee for the Eastern Central Atlantic (CECAF) under the aegis of FAO which has been trying to promote joint actions on living resource evaluation and fishery statistics

At the recent World Summit on Sustainable Development (WSSD), the governments recognised that over-fishing and the subsequent declining returns from the fisheries sector are greatly reinforcing the cycles of coastal poverty for millions of rural fishing communities around the world especially in sub-Saharan Africa, while at the same time threatening the marine biodiversity and coastal ecosystems that support fisheries. For this reason, the World Summit on Sustainable Development (WSSD) felt over-fishing represented a serious crisis meriting a concerted effort by the international community over the next 10 to 12 years, to restore the world's fisheries to health by the year 2015 (including the coastal ecosystems that support these fisheries). Some of the specific actions that participating governments, including the countries of the GCLME region, agreed to undertake are:

- Maintaining or restoring fish stocks to levels that can produce the maximum sustainable yield by 2015;
- Assisting developing countries in coordinating policies and programs aimed at the conservation and sustainable management of fishery resources;
- Strengthening donor coordination and partnerships between international financial institutions, bilateral agencies and other relevant stakeholders to enable developing countries to develop their capacity for sustainable use of fisheries;
- Establishing representative networks of marine protected areas, consistent with international law and based on scientific information; and
- Developing national, regional and international programs for halting the loss of marine biodiversity, particularly in coral reefs and wetlands.

The activities and programmes including agreed targets and action plans have created a new awareness of domestic issues and regional problems and engendered a certain sense of urgency on

fisheries depletion and environmental matters. However, their overall impact has been impaired by a lack of success in focusing on transboundary ecosystem-wide International Waters problems and the need to strengthen environmental and resource stewardship at both national and regional levels. This has been exacerbated by the absence of a mechanism for funding incremental costs in the existing Regional Seas Programmes, and a lack of resources for a co-ordination Secretariat. A proposed strategy for revitalising both the Abidjan and Nairobi Conventions exists and was embodied in the GEF funded Medium Sized Project implemented by Advisory Committee for the Protection of the Seas (ACOPS) and which ended with a "Partnership Conference" in September 2002 on the sidelines of the World Summit on Sustainable Development (Rio + 10 Conference) in South Africa.

National policy and legal framework can be found in the National Reports developed in the support of this project.

5.0 Major Perceived Transboundary Problems and Issues

The identification of the major perceived[3] problems and issues (MPPIs) is a first step in the TDA process and it constitutes the justification for the subsequent in-depth analyses. The significance of the perceived issues and problems should be substantiated on scientific, environmental, economic, social and cultural grounds. The MPPIs represent the perceptions of the scientific and expert community on the priority environmental issues of the region.

This section of the TDA analyzes the MPPIs to identify the technical basis supporting or refuting each MPPI as a priority issue in the GCLME region. The intent is to provide a technical rationale for prioritizing the MPPIs, to help guide the direction of future interventions to improve the regional environment. It will be of no use to identify major intervention efforts for an MPPI if the technical basis supporting its priority is missing. In such a case, the MPPI can be dismissed as a non-priority issue, or just as importantly, gaps in knowledge can be identified, and filling the gaps can become the next step towards addressing that particular MPPI.

The State of Coastal and Marine Environment of the Gulf of Guinea report (UNIDO/UNDP/NOAA/UNEP, 1998), the Coastal Areas Profiles of the GOG LME coastal states, the National Reports and the Regional Synthesis report summarises some of the studies that have been conducted in the coastal and marine environment of the GCLME. The various studies indicate alarming rates of decline of fisheries resources and significant levels of pollution including pathogens and micro-organisms in sewage, industrial effluents with high organic loading and hazardous chemicals, heavy metals, oils and hydrocarbons, tar balls in beaches, as well as serious problems of coastal erosion and coastal areas management. Other studies have also concentrated on weeds, water hyacinth and algal blooms. Studies have been conducted on marine fisheries resources of the Guinea Current region by CECAF, FAO, FRU-ORSTOM. Marine environmental and pollution monitoring programmes have also been carried out by WACAF in collaboration with UNEP/FAO/WHO/IAEA. A review of the status of marine fisheries resources in 1994 indicates that apart from offshore demersal resources, all other fisheries in the sub-region are near to full or fully exploited (T.O. Ajayi, 1995). This has resulted in loss of food security and increased conflicts between commercial (industrial) and artisanal (community-based) fisheries.

In summary, it is recognised that the coastal and the marine ecosystem of the GCLME and its

[3] "Perceived" is used to include issues which may not have been identified or proved to be major problems as yet due to data gaps or lack of analysis or which are expected to lead to major problems in the future under prevailing conditions.

resources have witnessed various environmental stresses as a result of the increasing socio-economic and unsustainable development activities. All the above studies and assessments have identified four broad coastal and marine environmental problems and issues in the GCLME region:

1. Decline in GCLME fish stocks and unsustainable harvesting of living resources;
2. Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including effects of global climate change;
3. Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms;
4. Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion.

The socio-economic and cultural implications from the above broad issues can be tremendous in terms of income reduction arising from a loss of fisheries stocks and catches, loss of recreation and tourism amenities and an increase in water treatment and coastal protection costs. Because of the paucity of reliable, detailed and historic scientific data on coastal, marine and freshwater environment in the GCLME region, a certain degree of uncertainty still prevails in assessing the pollution loading in general. There is an urgent need for a precise qualitative and quantitative assessment of the significant sources of land-based pollution as well as comprehensive assessments of the state of the fisheries resources and extent of ecosystem degradation (including status and trends analysis) in the region.

The above-mentioned coastal and marine environmental problems in the GCLME can be broken down into the following specific problems:

- Large-scale changes in the abundance levels of the resident fish stocks near shore and the conditions affecting the sustainability of the straddling (shared) and highly migratory fisheries of the region, both of which have food security and economic implications for the 280 million people of the region;
- Depletion of fisheries resources due to excessive and unsustainable harvesting of fisheries resources;
- Lack of prediction of natural fluctuations leading to sub-optimal fishing effort;
- Apparent increase in the frequency and extent of coastal erosion placing fisheries and other coastal communities in danger from loss of roadway and habitable lands;
- The physical destruction of coastal habitats including wetlands and mangroves, resulting in the loss of spawning and nursery grounds for living resources and the loss of the rich and varied fauna and flora of the region including some rare and endangered species;
- Uncontrolled and haphazard urbanization of coastal areas across the region that results in use conflicts and imposes great stresses on the environment and resources;
- Harbour construction activities that generally alter longshore current transport of sediments and in many cases have led to major coastal erosion and siltation problems;
- Large amounts of sediments emptied by the many large rivers in this region that are important sources of nutrients and suspended matter to the coastal and marine environment contributing to eutrophication and harmful algal blooms with serious implications for ecosystem and human health;
- Input of largely untreated sewage into the coastal environment impacting on health, tourism and fisheries. Sewage treatment facilities are very limited throughout the region and raw sewage is discharged both into coastal lagoons and the rivers flowing into them. This, combined with the limited tidal water exchange of lagoons, has led to widespread eutrophication;

- Discharge of untreated or partially treated industrial wastes directly into coastal water bodies that contaminate marine life and pose serious threats to human life;
- Use of pesticides, especially the organochlorine group of compounds, in agriculture and human health protection resulting in an input of residues to the coastal environment that are harmful to living resources;
- Risks from petroleum pipeline development, accidental spills of petroleum products and operational discharges from shipping (e.g. ship wastes) and the accidental introduction of toxic chemicals and exotic species that seriously damage the receiving ecosystem, leading to food and habitat loss.

The major impacts originating from individual coastal States that are invariably transboundary in nature in the sub-region include:

- Various states of depletion of straddling and highly-migratory fisheries stocks, including over-exploited, declining, and slow-recovering as a result of over-fishing and over-exploitation;
- Wastage through discard of by-catch with consequent loss of marine resources, biodiversity and biomass;
- Phenomenal rates of erosion of coastlines;
- Loss of critical habitats, particularly mangroves and wetlands, that sustain biological diversity and provide spawning and nursery grounds of migratory fauna of commercial importance and endangered species;
- Haphazard and unrestrained over-development of the coastal areas with incidence of erosion;
- Toxic chemical and oil spills, as well as discharges of oily ballast and exotic biological species discharges from ship traffic;
- Socio-economic implications including loss of revenue, food security concerns, resource use conflicts and increasing poverty.

Major Perceived Problems and Issues

From the national reports, questionnaires and other published materials, the TDA Task Team, constituted under the GCLME PDF-B, taking into consideration the GIWA methodology, analysed all the identified perceived regional transboundary environmental problems and issues and grouped them under the following four MPPIs:

- Decline in GCLME fish stocks and unsustainable harvesting of living resources;

- Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including effects of global climate change;

- Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms;

- Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion.

Below, each of these problems and issues is addressed from a status perspective. It answers the questions: what do we know about each problem/issue? What data support the quantification of the extent of the problem/issue? Do the data support these as real problems and issues, or just as perceptions? This analysis took place on a scientific level, including biological, oceanographic, physical, social and other perspectives on the problem. This is in effect the "status" assessment.

The next step was to perform a causal chain analysis; the major perceived problems and issues were analyzed to determine the primary, secondary and root causes for these problems/issues. Identification of root causes is important because root causes tend to be more systemic and fundamental contributors to environmental degradation. Interventions and actions directed at the root causes tend to be more sustainable and effective than interventions directed at primary or secondary causes. Because the linkages between root causes and solutions of the perceived problems are often not clear to policymakers, however, interventions commonly are mis-directed at primary or secondary causes.

This TDA attempts to clarify the linkages between root causes and perceived problems, to encourage interventions at this more sustainable level. Fortunately, root causes are common to a number of different perceived problems and issues, so addressing a few root causes may have positive effects on several problems and issues. The root causes of most of the environmental and resource problems in the GCLME area have to do with inadequate policy, ineffective compliance monitoring and enforcement, lack of community support and lack of legislation.

5.1 Decline in GCLME fish stocks and unsustainable harvesting of living resources

Status of the problem/issue

In some countries of the region, there is evidence indicating that the artisanal as well as the commercial fisheries have exceeded or are about to exceed the point of sustainability. Major lines pf evidence leading to this conclusion include: Decrease in the Catch per Unit Effort (CPUE) indicates the fisheries is exceeding sustainable yields (Ajayi, 1994); species diversity and average body lengths of the most important fish have declined (FAO, 2000).

Transboundary elements

Major transboundary elements of the problem can be summarized as follows:

- Loss of income from regional and global trade of marine products
- Region-wide decrease in biodiversity of the marine living resources including the disappearance of high-quality critical natural resources
- Region-wide destructive fishing techniques degrading mangrove habitats
- Increasing catch effort on pelagic species such as tuna, sardinella
- Non-compliance with the FAO Fisheries Code of Conduct

Environmental impacts

- Loss of biodiversity
- Changes in food web
- Changes in community structure due to over-exploitation of one or more key species

- Increased vulnerability of commercially-important species
- Long-term changes in genetic diversity
- Stock reduction
- Loss of predators
- Habitat degradation due to destructive fishing technique

Socio-economic impacts

- Reduced income
- Loss of employment
- Population migration
- Conflicts between user groups
- Loss of recreational opportunities
- Decline in protein

Over-exploitation of fishery resources, the use of destructive fishing practices and the destruction or modification of ecosystems can significantly affect the region's coastal communities. The GCLME supports a significant world fishery that is important for food security, and as a source of export income for the countries bordering this sea. The fisheries sector is highly significant in the GCLME in the context of domestic food security for the participating countries. Fish consumption is quite high in the region (see section 3.3-1) and contributes significantly to the protein intakes of the citizens especially in coastal communities.

Pelagic and demersal fisheries within the region are fully exploited with evidence showing that the landings of many species are currently declining. The decline in fish availability in the subsistence sector has led to the adoption of destructive fishing practices such as use of undersize meshes and blast fishing. Based on present consumption patterns and population growth rates, much of the region especially the large coastal cities of Lagos, Abidjan, Accra and Doaula, will have to produce significantly more fish by 2010 just to meet domestic demand. Pressure on the coastal resources is therefore likely to increase significantly in the immediate future. Despite nutritional requirements and current population growth rates, the industrial (commercial) fisheries sector in the countries surrounding the GCLME generally exports the trawl fisheries products (Figure 5.1-1)exacerbating the problems associated with food security situation in the region.

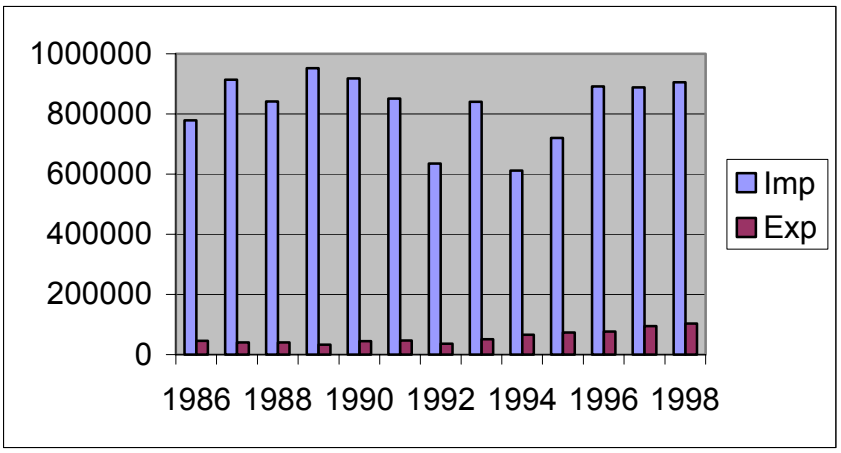


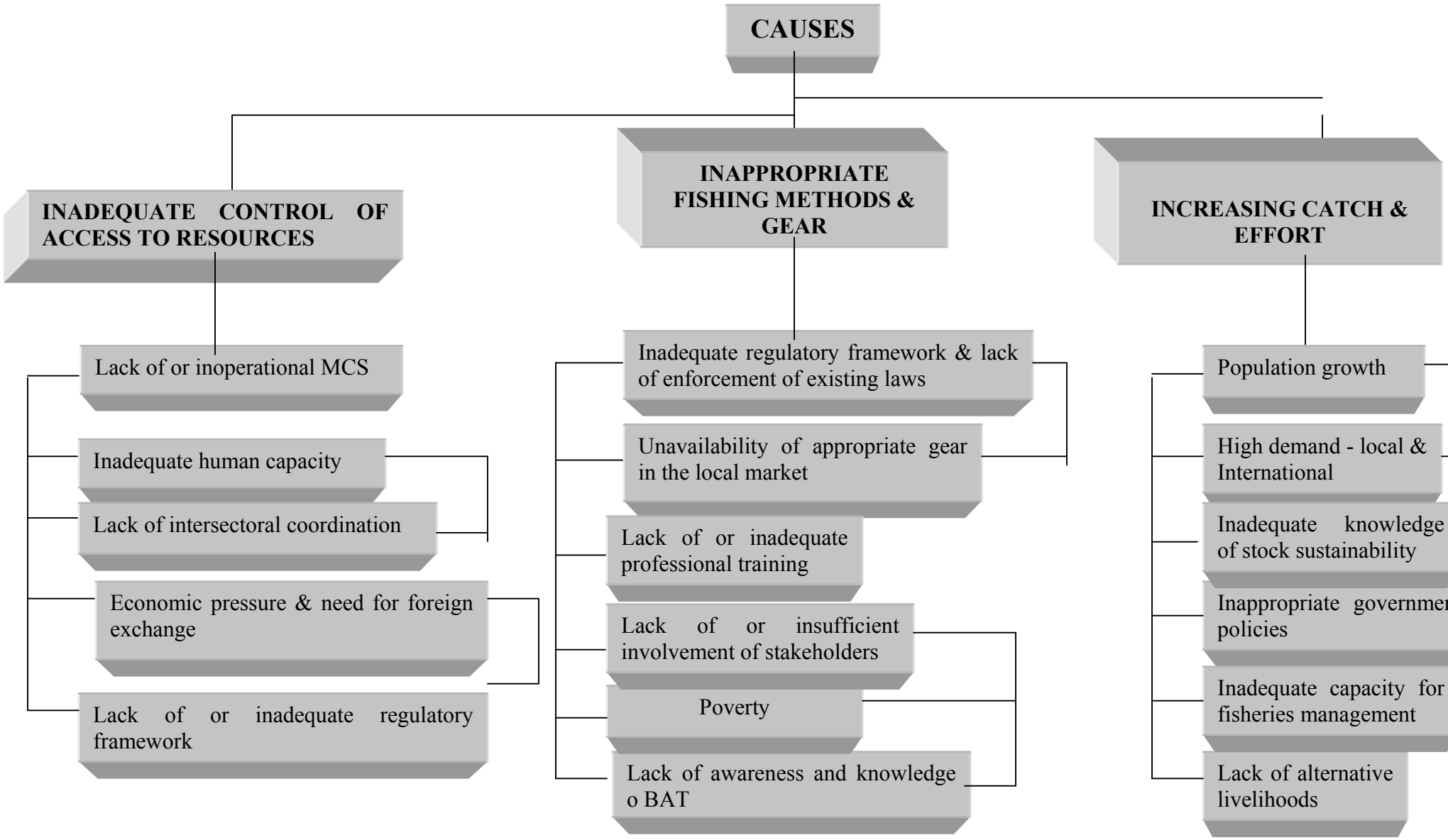
Figure 5.1-1. Fish imports and increasing exports by GCLME Countries

The estimate of the numbers of fishing canoes in some countries of the region ranges from 7,350 in Cameroon, 8,650 in Ghana to 200,000 in Nigeria (Report of Working Commission I: in Ibe *et al.,*1998). The motorisation rate for the canoes can reach up to 50% as it does in Nigeria. The number of fishermen is also quite high: approximately 24,000 in Cameroon and 7,600 in Cote d'Ivoire. It is estimated that over 60% of current national fish landings in the GCLME region are made by artisanal fishers (FAO, 1997).

Causal chain analysis

A causal chain anlysis was performed to identify the primary, secondary, and root causes of fisheries decline in the region, as illustrated below

Fiqure 5.1-2. Causal Chain Analysis: Decline in GCLME Commercial Fish Stocks and Non-Optimal Harvesting of Living Resources



Sectors and Stakeholders

The main government sectors involved in the fisheries issues are the fisheries, agriculture and environment ministries and agencies, and municipal and state (provincial) governments. The Stakeholder Analysis identified the energy ministries as major government impact sectors (perhaps for both oil and gas sector impacts as well as hydropower). Affected stakeholders include local fishermen, coastal zone residents, and scientific community.

Supporting data:

The continental shelves of Guinea Bissau, Guinea and Sierra Leone are characterized by coastal fish assemblages (croakers) principally located in nutrient-rich estuarine and inshore areas. The GCLME is already showing evidence of ecosystem stress with major fluctuations of commercially valuable species. Significant changes in species composition have occurred over time as a result of over-exploitation of several demersal and pelagic fish species especially by foreign trawlers in the offshore areas. The size spectrum of fish is moving towards smaller size classes. Recent trawl surveys conducted in Ghana showed that significant changes were occurring in the demersal fish biomass in terms of distribution, abundance and reproductive strategy.

A case in point is the continuous fluctuations between the two species, the grunt and Triggerfish in the last two decades. The grunt maintained for a time its position at the top of the list of demersal fish but later gave way to the triggerfish which dominated the ecosystem from the early 1970s to the late 1980s, after which time it dramatically decreased in abundance (FAO, 1997). Koranteng and McGlade (2002) attribute the almost complete disappearance of the Triggerfish after the late 1980s to observed environmental changes and upwelling intensification in the central part of the GCLME, off Ghana and Cote d'Ivoire (Koranteng, 1988). There was a subsequent increase of the Sardinella population. The Sardinella industry had collapsed in 1973, but subsequently recovered to unprecedented levels during the 1980s (Cury & Roy, 2002). The exploitation rate applied to cuttlefish stocks has been increasing since 1984 and by 1990 was considered to be equal to, or slightly above, the optimal fishing effort. The rate of growth of these organisms appears faster than previously estimated (FAO, 1997).

Such changes in fishery patterns appear, in part, to be related to overfishing, as evidenced by a decline of Catch-Per-Unit- Effort and the taking of young immature fish by artisanal fishermen. They also appear to be related to environmentally-driven changes to pelagic stock distribution. For instance, CECAF (1994) assessed the biomass of the small pelagics in the western and central Gulf of Guinea as 392,000mt. The current level of exploitation in the area is about 257,000mt annually clearly showing over-exploitation (Mensah & Quaatey, 2002). The observed recent high catches of the resource (which exceed the estimated potential yield) are due mainly to the intensity of upwelling in the area).

In Guinea, current estimates based on recent trawl surveys indicate a total biomass of demersal resources to be around 180,000 t, of which 44,000 t are of high or medium commercial value. Assessments made by CECAF in 1991 were updated in 1994 (Working Group held at the Centre national des sciences halieutiques de Boussoura, Conakry, Guinea) and show that total demersal biomass decreased by around 50% between 1991 and 1994. The decrease in biomass of the main demersal species, such as croakers, threadfins and sicklefish, was higher than 50%. It was suggested that this change in biomass was related to the recent increase of small-scale artisanal and industrial fishing efforts. Interactions with the more commercial large-scale fisheries have led to major problems for the traditional artisanal fishery. Fishery production of the coastal area up to 20m depth was estimated at about 40,000 t per year.

Trawl surveys carried out on the Guinea continental shelf have shown that between 1985 and 1990 the estimated biomass of coastal resources in waters less than 20 m deep (roughly up to 15 nm offshore) declined from 112,000 to 49,000 t during the rainy season and from 72,000 to 48,000 t during the dry season. This reduction between 1985 and 1990 can be explained by the increase in fishing activity of trawlers in inshore areas.

In Sierra Leone, the artisanal fishery exploits small pelagic species only. Their current level of catches ranges between 22,000 and 30,000 t. Acoustic surveys have estimated biomass to be between 70,000 and 120,000 t, suggesting that controlled development of the industrial sub-sector may be possible. Current annual landings for demersal stocks by trawlers ranged from 8,000 to 20,000 t between 1991 and 1993. Reduced catch rates are currently observed in the fishery and the level of exploitation of demersal fish stock is considered high. MSY has been estimated to lie between 46,500 t and 65,000 t.

Current annual production of Southern pink shrimp in Sierra Leone was found to fall within the MSY estimate of 2,600 to 3,500 t. Reduced catch rates are currently observed in the fishery, and the level of exploitation of shrimp is considered high. In the west and central Gulf of Guinea, potential catches of shrimps were estimated at 4,700 t, and stocks were considered over-exploited. Demersal resources are fully exploited with biomass estimates ranging between 64,000 and 104,000 t.

Marine resources of the Gulf of Guinea are mainly exploited by Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon and Equatorial Guinea, among others. Multi-species fisheries are common in the Gulf of Guinea. Small pelagic resources are exploited by small-scale gillnets and semi-industrial purse-seine in Côte d'Ivoire, Ghana, Togo and Benin and exclusively by small-scale fisheries in Nigeria and Cameroon. Coastal demersal resources are composed of sciaenids (exploited by small-scale and semi-industrial fisheries in Nigeria, Benin, Togo and Cameroon), groupers and snappers (fished in Togo and Ghana with hooks-and-lines in untrawlable areas), and sparids (Côte d'Ivoire and Ghana). The white shrimp resources off Nigeria and Cameroon are fished exclusively by artisanal fishery while pink shrimp is exploited by trawlers of the semi-industrial fishery. Penaeid shrimps in Togo and Benin and in Côte d'Ivoire are caught in lagoon fisheries. The offshore demersal resources of Ghana and Côte d'Ivoire are made up of sparids along with the slope community, while the offshore demersal resources of Nigeria and Cameroon are primarily drift fish and redfishes.

The recent biomass estimates of 7,000 t in Congo and 31,000 t in Gabon for stocks of Sciaenidae and Sparidae were based on acoustic surveys carried out in 1994. Demersal resources were either close to, or fully exploited. Effort reduction and redistribution would be beneficial, as fishing concentrates in the inshore zone and on juveniles. Small pelagic species (sardinellas, mackerels and anchovies) are important but unstable resources in the Western Gulf of Guinea (Côte d'Ivoire-Ghana-Togo-Benin) and their stocks are shared. Sardinella stocks seem to be in good shape. Substantial recruitment of *S. aurita* has been observed in Ghana and Benin in 1988 and 1989. The fishing pattern in recent years has been different from that of 1985 and 1987, with regard to the availability of the resources. Potential catches of small pelagics in the west and central Gulf of Guinea have been estimated at 330 000 t and are fully exploited. Little is known about pelagic and demersal resources in the whole southern Gulf of Guinea. Many countries have not developed an appropriate database and research structures to analyze stock exploitation status.

Acoustic surveys in the northern shelf of Angola indicated during 1985-1989 a decline in the biomass of small pelagics (sardinella and horse mackerel). The trend has dramatically reversed during the 1990s and the current biomass level now exceeds 500 000 t. Horse mackerel (*T. trecae*) biomass was estimated at about 250 000 t (1994). High biomass values for both round sardinella and Madeira sardinella were also recorded in the South Gabon - Congo region, 135

000 t in 1994. Horse mackerel biomass was estimated at 25 000 t. These estimates indicate a considerable increase in biomass compared to previous survey results, confirming the trends observed in Angola. Small pelagic stocks are considered under-exploited.

The maximum sustainable yield (MSY) for Nigerian fisheries was estimated by Tobor (1990) at 240,000 mt. According to Moffat and Linden (1995), official catch figures have greatly exceeded the MSY for 1980 to 1989. In spite of the limitations of estimating MSY in circumstances where catch efforts and standing catch data may be inadequate, there are other pointers to declining fish depletion and over-exploitation. In Rivers State of Nigeria for example, between 1980 and 1982, catches which ranged between 86,000 to 107,000 tonnes, decreased to values ranging between 16,000 and 19,000 tonnes in the 1986 to 1987 period (Moffat and Linden, 1995). This supports the notion that catches were well above the carrying capacity for several years.

Environmental changes manifesting a periodic variability in coastal upwelling intensities are playing a role in coastal pelagic fish abundance fluctuations. For instance, the east and west flows and position of the Guinea Current may play a role in these population fluctuations. Shifts in biomass appear to be connected to a shift in the boundary of the Guinea Current. These alterations have been linked to oceanographic changes including the southward displacement of the Intertropical Convergence Zone (ICTZ) during Atlantic El Ninos.

A large artisanal fisheries sector with strong traditional roots in the region had used bottom set nets, hook and line and beach seines to catch demersal fish for the populations of Sierra Leone, Ghana and Togo. After the 1960s, the GCLME's transboundary straddling and migratory stocks attracted commercial offshore fishing fleets. Their fishing efforts exerted extreme pressure on the fishing resources, placing them at risk of collapse. This was exarcebated after 1982 by the return of local industrial fleets that had previously fished other EEZ waters but were barred from them according to the new UNCLOS provisions pertaining to Exclusive Economic Zone. This resulted in a significant increase in trawling effort and landings (especially of demersal fisheries). The time series analysis of Catch-Per-Unit-Effort (CPUE) of Koranteng (2002) for both small-sized inshore vessels and industrial trawlers in Ghana showed a consistent rise in industrial trawling from the mid-1970s and a downward trend in the late 1980s in inshore seasonal fishing. There was also a consistent rise in industrial trawling effort and a decline in that of inshore trawlers operated by artisanal fishermen. The CPUE exceeded sustainable yields in some of the countries bordering the GCLME and led to a decline in both demersal and pelagic species diversity and average body lengths of the most important fish species.

Tables 5.1-1 through 5.1-2 present some basic information regarding the fisheries in the region. Taken together, they indicate both rising catches due to overfishing, and declining catches due to depleted fisheries. Figures 5.1-2 through 5.1-5 demonstrate the variety of fisheries in the GCLME, and the history of their catch. Unfortunately, data are neither consistent through time nor complete, and so the inference regarding depletion of resources is based on a synthesis of available data.

Table 5.1-1. Average Annual Marine Fish Catch and Percentage Change of Countries in the GCLME

Country	Average 1993-95 (10^3 mT)	Percent change 1983-85
Angola	77.5	(1)
Benin	13.5	192
Cameroon	41.9	25
Congo	17.5	8
Cote d'Ivoire	57.5	(22)
Equatorial Guinea	3.3	15
Gabon	240	28
Ghana	299.6	34
Guinea	60.3	130
Guinea Bissau	5.3	75
Liberia	3.8	(61)
Nigeria	187	14
Sierra Leone	47.1	34
Togo	8.7	(23)

Negative numbers are in parentheses
Source: World Resources 1998-99

Figure 5.1-2. Mean Catch Rates Recorded in the F.T. Susainah Survey, 1999

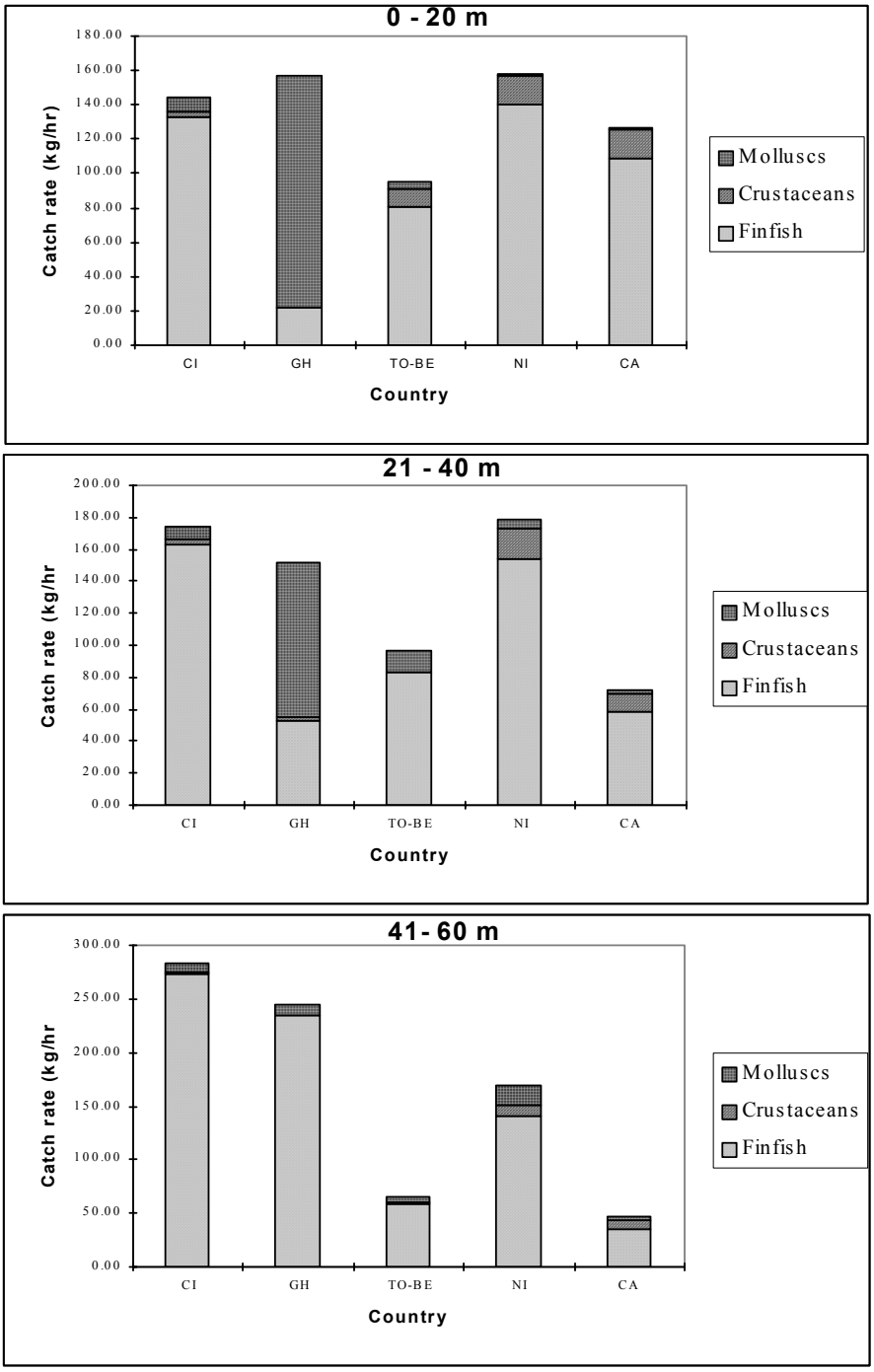
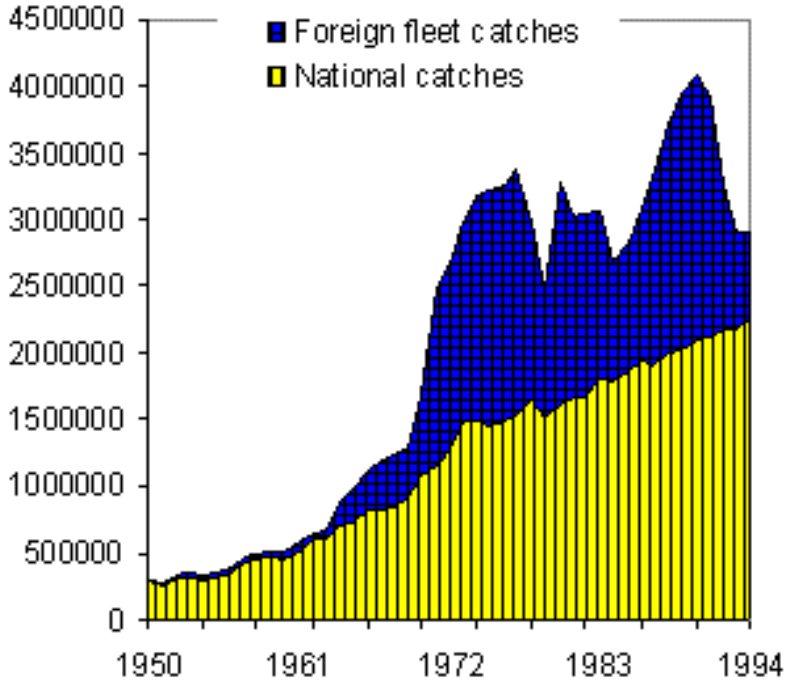
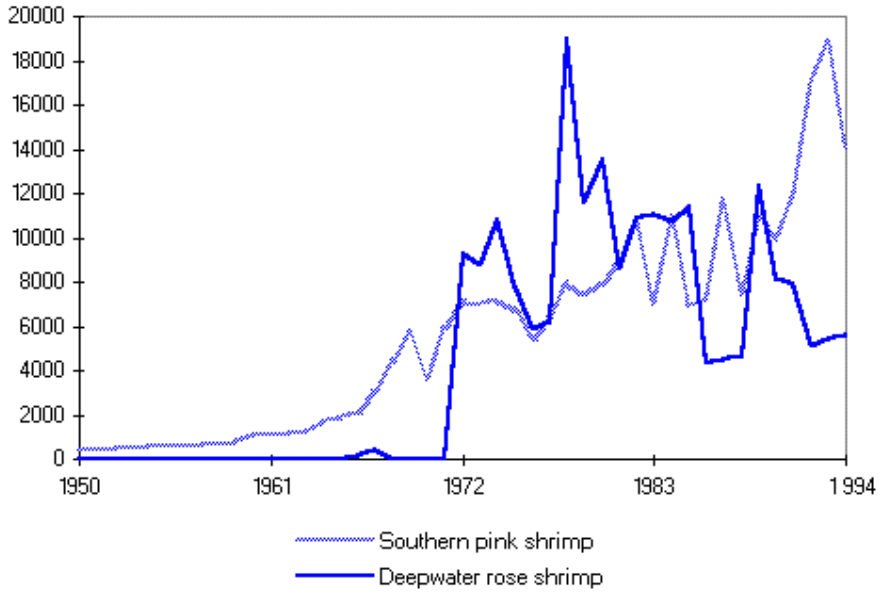


Figure 5.1-3. National and Foreign Fleet Catches in the GCLME Region, January 1998



Catches of ISSCAAP Group 45 (shrimp, prawns, etc.) represent 1.4% of the total catches. Southern pink shrimp catches started to become significant in 1966 and have since regularly increased with a sharp peak, reaching 19 000 t in 1993 before declining to 14 000 t in 1994. The deepwater rose shrimp fishery started from nothing in 1971 and catches have shown a great variability, with a very high value of 19 000 t in 1978 but only about 5 000 t in 1986-88 and 1992-94. (ISSCAAP= International Standard Statistical Classification of Aquatic Animals and Plants)

Figure 5.1-4. Shrimp Catches for the GCLME Region



Source: FAO, 1997

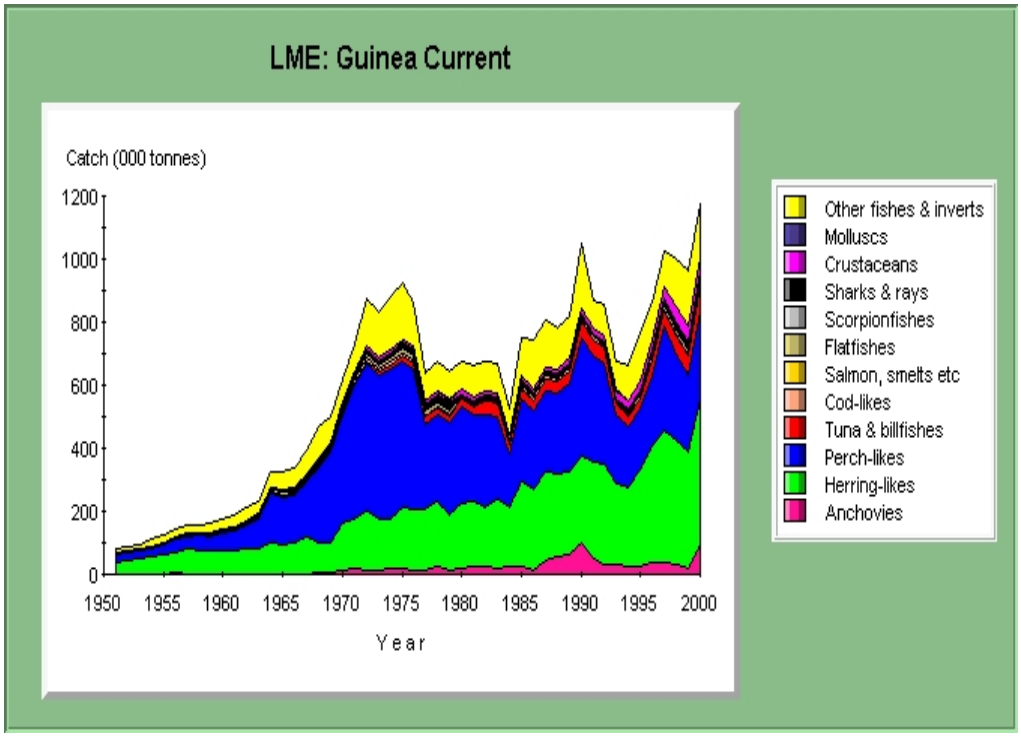
Table 5.1-2. Densities (Kg/ha) and Catch Rates Kg/h of Total Demersal Resources and Selected Species Obtained in Trawling Surveys on the Continental Shelf of Ghana, 1963-1990

SPECIES	*GTS CPUE	Densities (kg/ha)				
	1963-64	1969-70	1981-82	1985-86	1989-90	1990
B. auritus	24-35	2,4	-	8,3	3,5	0,2
E. aeneus	1-24	0,5	-	2,1	0,7	0,8
P. bellottii	12-103	1,6	-	4,9	1,4	1,4
D. canariensis	1-15	1,3	-	2,2	0,9	1,0
S. caeruleostictus	4,39	1,0	-	2,7	1,1	1,8
D. volitans	1,86	0,9	-	0,2	0,6	2,5
P. prayensis	9,26	0,7	-	2,7	1,2	0,7
Sepia spp	1-12	1,2	-	1,2	0,6	3,8
TOTAL DEMERSAL	23,5 kg/ha	36,0	93,9	62,1	19,4	22,8

* Guinea Trawling Survey

Sources: FRUB, Tema, In Ajayi (1994)

Figure 5.1-5. Fisheries Catch in the Guinea Current Large Marine Ecosystem



(source: University of British Columbia, at http://data.fisheries.ubc.ca)

5.2 Uncertainty regarding ecosystem status, integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species) and yields in a highly variable environment including effects of global climate change

Status of the problem

Environmental changes manifesting a periodic variability in coastal upwelling intensities are playing a role in coastal pelagic fish abundance fluctuations in the GCLME. For instance, the east and west flows and position of the Guinea Current may play a role in noticeable population fluctuations of the Triggerfish that appeared in large quantities in the 1970s but have now completely disappeared. Shifts in biomass appear to be connected to a shift in the boundary of the Guinea Current. These alterations have been linked to oceanographyic changes including the southward displacement of the Intertropical Convergence Zone (ICTZ) during Atlantic El Ninos. In addition to natural variability, the ecosystem status is affected by human activities (overfishing, introduction of alien species, and contamination, for instance). Inadequate state of knowledge of the ecosystem status and lack of regional coordination in studies of biodiversity, habitats, and ecotones hinders effective management on a national and regional level.

The most significant changes on the abundance of fish species in the region are fluctuations in sardinella species, dramatic increase in the abundance of triggerfish (Balistes capriscus) between 1973 and 1988 and the decline of the species since 1989 (Koranteng, 2001).

Occasional changes have been witnessed in the biodiversity of the region. The Bivalves species (Chlamys opercularis) was caught in large quantities as never before during a trawl survey conducted in 1998. It has been suggested that the bivalve species may have been introduced into the region through ship ballast water. These changes in biodiversity have been attributed to both natural (intensification of the minor upwelling, water temperature changes) increase in salinity of shelf waters (Binet, 1995) and changes in meteorological and other oceanographic conditions (reduction of rainfall, acceleration of winds and alteration of current patterns (Binet, 1995) and changes in nearshore biophysical processes (Koranteng, 2001).

Transboundary elements

The Guinea Current environment is highly variable and the ecosystem is naturally adapted to this change. Sustained large-scale environmental events such as ENSO, flooding, algal blooms, Benguela and Canary Current intrusions and changes in winds, however, affect the ecosystem as a whole, compounding the negative effects of fishing. These events and changes generally have their origin and cause outside of the GCLME, but are of such a scale that the impacts occur in their international waters areas of all sixteen countries i.e. the changes propagate across external GCLME boundaries and internal geopolitical boundaries. The poor ability to predict events and changes limits the capacity to manage effectively system wide. Additionally, the GCLME is believed to play a significant role in global ocean and climate processes and may be an important site for the early detection of global climate change.

Most harvested fish species are shared between countries and straddle geopolitical boundaries. Past over-exploitation of targeted fish species has altered the ecosystem as a whole, impacting at all levels, including on top predators and reducing the gene pool. Some species, e.g. sea turtles, are threatened or endangered. Exotic species have been introduced into the Guinea Current Region. (This is recognised as a global transboundary problem.)

Environmental impacts

Fluctuations in biodiversity

Socio-economic impacts

Food deficit/abundance depending on phase of cycle of natural variability
Lack of ability to depend on reliable artisanal fisheries in some cases
Instability in coastal populations due to fluctuating food sources
Possible intrusion of offshore/industrial fisheries into areas of conventional artisanal fisheries when offshore resources are declining

Sea-level rise and other global change impacts may affect the coastal populations and infrastructure (e.g., Table 5.2-1 and 5.2-2).

Table 5.2-1. Summary of Impacts and Response Costs for a One-Meter Sea-Level Rise in Nigeria

Land at risk (km2)	18,120 to 18,396
Population at risk	3,180,000
Value at risk (million)	US$18,134
Important area protection	US$558 to 668
Total protection	US$1,424 to 1,766

Source: French and Awosika, 1993

Table 5.2-2. Estimated Number of People (in millions) That Will be Displaced by Sea-Level Scenarios

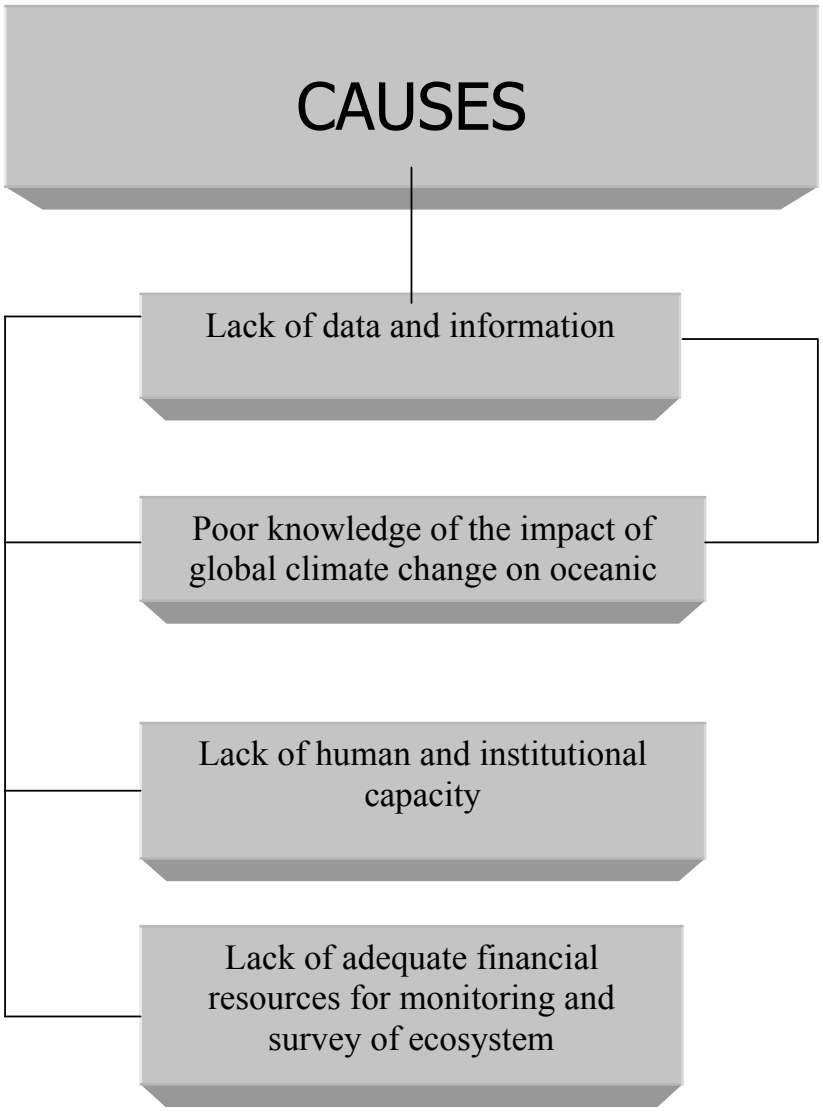
Slr Scenarios	0.2m	0.5m	1.0m	2.0m
Barrier	**0.6**	**1.5**	**3.0**	**6.0**
Mud	**0.032**	**0.071**	**0.140**	**0.180**
Delta	**0.10**	**0.25**	**0.47**	**0.21**
Strand	**0.014**	**0.034**	**0.069**	**0.610**
Total	**0.75**	**1.86**	**3.68**	**10.00**
% Total Pop.	**0.07**	**1.61**	**3.20**	**8.70**

Source: Awosika *et al.,* 1992

Causal chain analysis

A causal chain analysis was conducted to determine the primary, secondary, and root causes of global change and uncertainty in ecosystem status.

Figure 5.2-1. Uncertainty Regarding Ecosystem Status and Yields in a Highly Variable Environment Including Effects of Global Climate Change



Sectors and stakeholders

Stakeholders for global change are varied and inclusive. Prominent stakeholders include:

Artisanal fishermen

Coastal populations interacting with artisanal fisheries

Local governments

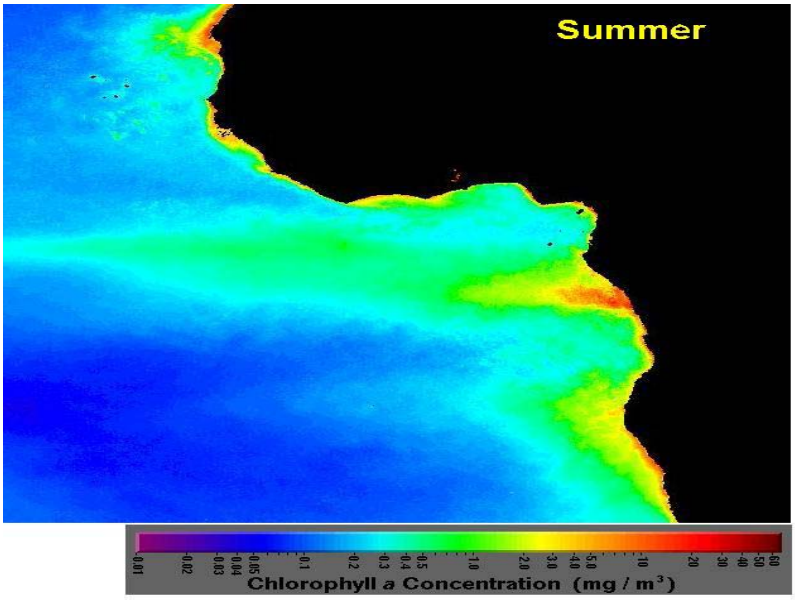
Tradesmen

Children and women

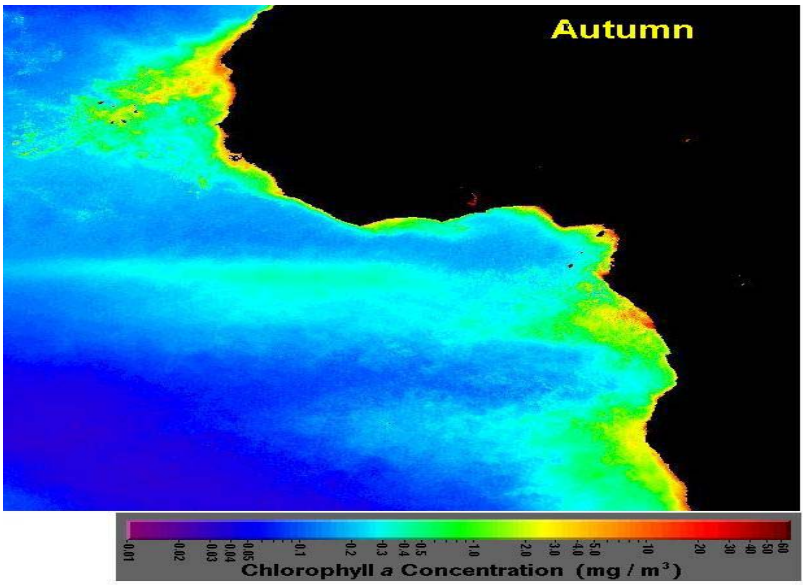
Supporting data

Plankton research in the Gulf of Guinea began in the late nineteenth century with oceanic expeditions to the area by some European countries to assess the biodiversity in the region. Among the major expeditions were the *Buccaneer* in 1886, *Valvivia* in 1898, *Meteor* in 1925, *Dana* in 1930, the *Atlantide* in 1945-46 and the *Calypso* in 1956 (Voss, 1966). Following such expeditions, the role of plankton in the region's marine productivity gained importance and national institutions responsible for fisheries included plankton monitoring in their activities. For example, in Ghana the Fisheries Research and Utilization Branch (now Marine Fisheries Research Division) carried out monthly monitoring of zooplankton from 1962 to 1995 (Mensah and Koranteng, 1988; Mensah 1966). The data provided a crude indication of the size of future fish stocks – an increase in secondary production meant enough food for fish larvae and thus an increase in fish stock.

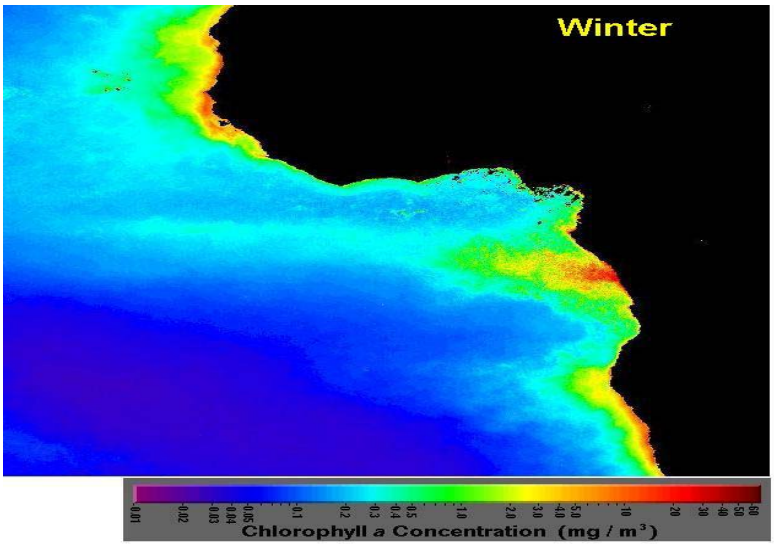
The GCLME is considered a Class I, highly productive (>300 gC/m2-yr) ecosystem based on SeaWiFS global primary productivity estimates (Figures 5.2-2 through 5.2-5). Primary productivity peaks from June to September, stimulated by nutrient level increases related to the first rains in June, upwelling later in the year, and large riverine floods from September to October. Because of the shallow depth of the Guinea Current and vertical migration patterns of the zooplankton, the phytoplankton and zooplankton biomass cycles are in phase with seasonal upwelling. The zooplankton biomass peaks very soon after the phytoplankton blooms. The plankton survey, using Ships of Opportunity, conducted in the waters of the Gulf of Guinea LME during the pilot phase GOGLME project was the first regional effort to monitor the plankton in the sub-region. The results have provided spatial and temporal information on plankton variability in the area. The data are also being used, in conjunction with other parameters, in estimating the carrying capacity of the Gulf of Guinea fishery.



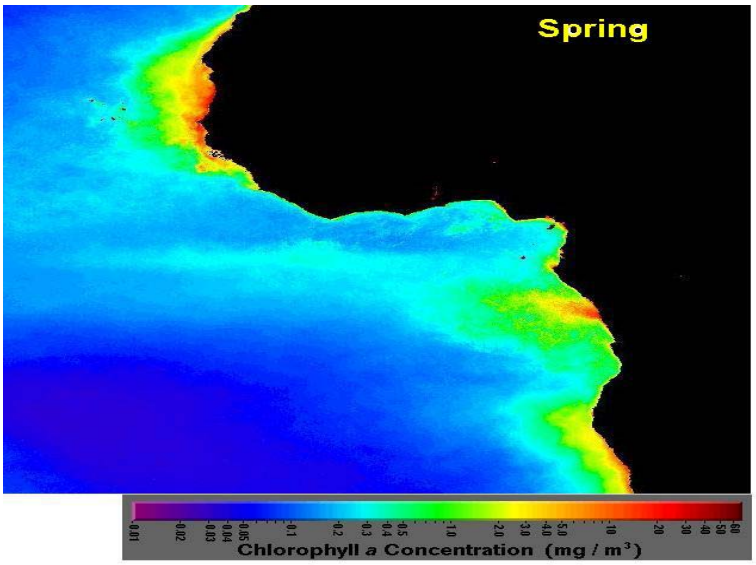
5.2-2: Primary Productivity estimated from SeaWiFS data for Summer.



5.2-3 Primary Productivity estimated from SeaWiFS data for Fall



5.2-4 Primary Productivity estimated from SeaWiFS data for Winter



5.2-5 Primary Productivity estimated from SeaWiFS data for Spring

The Primary productivity surveys in the Gulf of Guinea, using these ships of opportunity towing Continuous Plankton Recorders (CPR), indicated new and emerging patterns of productivity that contain at the same time hopeful and distressing signals (Figures 5.2-6 through 5.2-8). The hopeful signs come from the discovery of new areas of upwelling (e.g. off Benin and Nigeria) besides those already known which has led to upward revisions of potentially available fish stocks in the Gulf of Guinea. The distressing signs arise from the increasing occurrence of harmful algal blooms indicating intense eutrophication and therefore excessive nutrient loading in the Gulf of Guinea from anthropogenic sources. There is a need for more assessment of plankton amount and type, for more information on currents, upwellings and the availability of nutrients for ocean fauna and flora. Continuous Plankton Recorder (CPR) tows must continue to build upon already acquired results, and must be extended to the natural limits of the LME in order to build a comprehensive picture of productivity patterns on an ecosystem-wide level, with regard to the LME's carrying capacity for living resources.

Figure 5.2-6. Plankton Monitoring Routes in the Gulf of Guinea

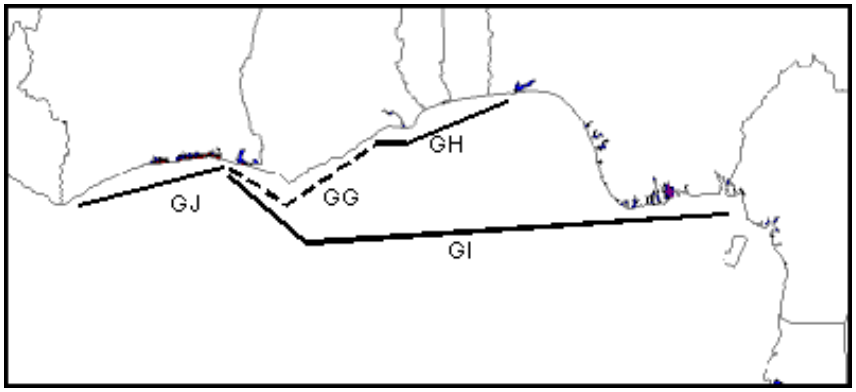
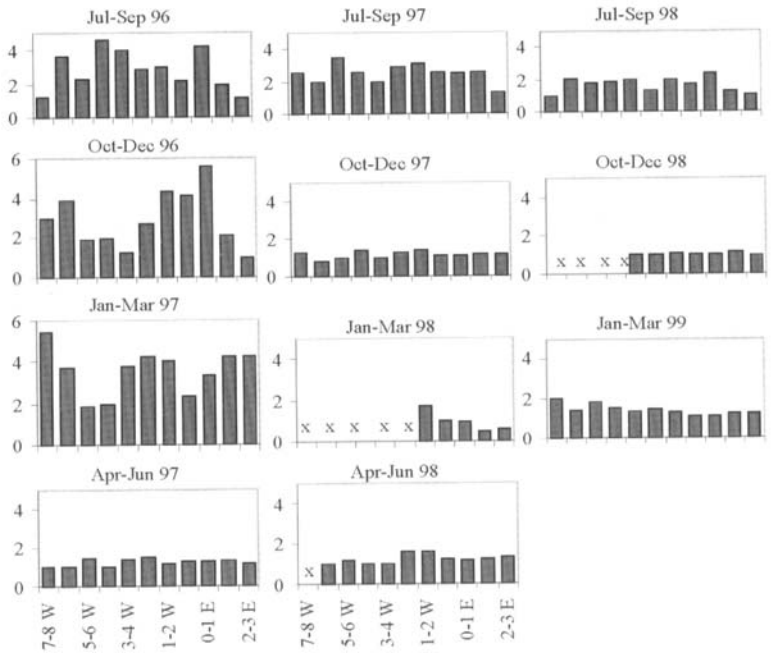
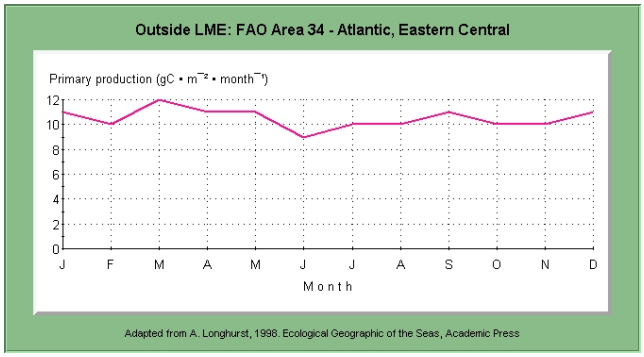


Figure 5.2-7. Mean Seasonal Phytoplankton Colour Taken in Each Degree of Longitude Along the CPR Routes



Source: SAHFOS Report, 1999

Figure 5.2-8. Primary Productivity Patterns in the CECAF Region Covering the GCLME



As discussed in more detail in Section 5.1, the GCLME is rich with living marine resources and commercially-valuable fishes, both marine and coastal. Fish species include croaker, grunts, snapper, sardinella, triggerfish and tuna. During the last two decades there have been substantial fluctuations in the fishery, with the triggerfish (Balistes carolinensis) increasing dramatically in the 1970s followed by a severe decrease and the 1973 collapse of the Sardinella fishery. The latter subsequently recovered to unprecedented levels during the 1980s (Binet, *et al.,* 1991). The changes in fishery patterns appear to be related to a new geographical distribution of pelagic stocks. Shifts in fisheries populations may be caused by environmental factors. For instance, Ibe and Ojo (1994) observed that, with the exception of Ethmalosa sp., the Sardinellas appear not to be abundant in the water sectors where the mixed layer is of low salinity and warm water present all the year round ($T>24^0C$; $/<35^o/_{oo}$). With global warming it is thus likely that the Sardines may not be found in the Grain Coast and Bight of Biafra sectors that exhibit the above-mentioned characteristics.

The respective east and west flows and position of the Guinea Current may play a role in population shifts. Acoustic surveys taken between 1980 and 1990 indicated a sudden increase in fish density on the Ivorian shelf (see Marchal, 1993). The shift in biomass appears to be related to a shift in the boundary of the Guinea Current. These alterations are probably linked to distant climate anomalies, such as the southward displacement of the ICTZ during Atlantic El Niños. A greater understanding of oceanographic processes is needed to improve ecological forecasts. There are indications that anticipated sea-level rise due to climatic changes would affect the aquatic life especially in the brackish waters of the GCLME (Ibe and Ojo, 1994). The change in water level, when it occurs, is likely to upset the breeding habits of some fish already used to existing habitats while new species may or may not survive in the new environment. It is also expected that by possible reduction in upwelling certain types of fish production will be reduced.

Environmental monitoring in the GCLME region relies mainly on a set of coastal stations, on the Comprehensive Ocean Atmosphere Data Set (COADS) database and on satellite imagery. This provides useful information on a limited set of variables such as SST and wind. These variables can be related to fish population dynamics at different scales of observation including short-term changes in fish availability, year-to-year abundance or lower frequency regime shifts. The joint Soviet-Sierra Leone oceanographic cruises in Sierra Leone waters in 1987-1988 reported a warming up of the waters and a change in the composition of the fish stocks, but longer term data are required before definite inferences can be made concerning the short term trends in fisheries composition/changes due to impacts of climate change. In addition, salinity stress consequent upon the ingress of seawater due to sea-level rise would lead to disruption of the coastal fishery by causing disorganization in the faunal assemblages in estuarine, deltaic and lagoonal environments resulting in the redistribution of species and failures in the reproduction and survival of their eggs/spores and larvae/sporophytes. Predator/prey relationships would be altered to the advantage of predators.

Along the Cote d'Ivoire continental shelf, environmental patterns have been investigated using data collected from 1966 to 1984 (Morliere and Rebert, 1972; Hisard, 1973; Colin, 1988). Characteristics of coastal upwelling and their interannual variability are well documented (Morliere, 1970; Voituriez, 1981; Ibe and Ajayi, 1984). Along the Cote d'Ivoire shoreline, this seasonal enrichment supports pelagic and demersal fisheries, both very sensitive to environmental change (Binet *et al.,*1991; Pezennec and Bard, 1992; Binet, 1993). Continental influence is linked to four major rivers namely Cavally, Sassandra and Bandama Rivers flowing directly to the Gulf of Guinea, while the Comoe River flows seaward through the Ebrie Lagoon and the Vridi Canal. These large river inputs are high during the flood season from October to December. Rainfalls in the coastal forest area induce local river floods during the rainy seasons, from April to June and from October to November (Binet, 1993; Mensah, 1991). Since 1982, a weekly hydrological sampling (temperature, salinity and Secchi disk measurements) has been maintained around the Abidjan coastal zone (Bakayoko 1990; Cissoko *et al.,*1995, 1996). The study was to describe the seasonal and interannual fluctuations of physical parameters in relation to major continental (rain, river floods) and oceanographic events (upwelling) in the northern Gulf of Guinea during the 1992-1997 period and to compare these data to older information; and to assess the respective importance of these hydrological factors on the pelagic system (bacteria and phytoplankton) in that coastal station. Results obtained from the study shows that hydrological conditions observed at the coastal station off Abidjan are strongly influenced by the seasonal variability of three major phenomena: rainfalls, river floods and upwellings. Upwelling enriches the neritic ecosystem, exerting an immediate infuence on biological production, on phytoplankton and consequently, on bacterioplankton. Therefore, during four to five months (main upwelling plus short cold events), the coastal ecosystems can be considered as productive.

The neritic area along the eastern Cote d'Ivoire coastline can be presently considered as more productive than a few decades ago with the nutrient-poor situation lasting less time, and the nutrient-rich situation lasting longer. This could explain the recent outburst of small pelagic

fishes (*Sardinella aurita*) in this part of the GCLME (Arfi *et al.,*2002). This supports the earlier environmental time series analysis conducted by Koranteng and Pezennec (1998) showing transition from a depleted to a prosperous state of *Sardinella aurita* as CPUE increased from 0.8 to 7.2 tons/day before and after 1980 during the upwelling period.

Numerous sources of data have been used to evaluate the natural variability of the GoGLME during the pilot project. These include some of the methods indicated in Table 5.2-3.

The above impacts are a few of the possible documented consequences of global warming and climatic changes on the ocean dynamics of the GCLME region. These can be further elucidated through the collection of more observational data and development of regional oceanographic models. The partnership with GOOS-Africa would facilitate the development of environmental prediction models for the GCLME region.

The sudden collapse of the Ghana-Ivoiro sardinella fishery from 95,000 t (over and above 40,000 t predicted MSY) to 2,000t a year and its seeming substitution by *Balistes spp*., trigger fish recording 200,000 tonnes a year up from nothing at all have been recorded in the GCLME. Off Nigeria, tiger prawns, *Penaeus monodon* hitherto unknown have become commercial whereas *Parapeneopsis atlantica*, brown shrimp; diminished in abundance. The fisheries assessment survey cruise conducted during the pilot phase Gulf of Guinea LME project found *Chlamys sp* in quantities hitherto unrecorded. Without a doubt environmental and climatic forcing (Koranteng and McGlade 2002) causative of biomass flips or species succession have to be further researched and factored into management strategies for ecosystem (including species composition and biodiversity) preservation (Ajayi, 2001).

There has been a noticeable increase in the incidence of aquatic weed infestation in some of these countries. Aquatic weeds are a real scourge in coastal waters due to the environmental and socio-economic impacts. For a decade in In Côte d'Ivoire these weeds have invaded coastal sites, drifting with freshwater. The Ivorien government has been aware of the harmful effects of these plants since 1980. The first specie, *Pistia stratiotes*, was endemic to freshwaters. Then in 1984, a new specie, *Salvinia molesta*, originating from America, was introduced. In 1986, a third specie, *Echornia crassipes*, was introduced. Most of the large reservoirs are colonised (Ayamé I and II, Taabo and Buyo), as are the rivers and the lagoons (Ebrié and Aby). Large rafts of *E. Crassipes* and associated species are carried seaward and then run aground on the beaches.

Invasion of GCLME coastal waters by aquatic weeds has some negative impacts on the fishing activities and on the fishing zone. Most of the time, the fishing activities are slowed down and even stopped for weeks or months until the weeds disappear. It is difficult, even impossible, to use castnets or mesh nets for fishing. The setting of traps is also difficult because of the inaccessibility of most of the fishing zone. This phenomenon is common in the Aby Lagoon where the boats cannot dock. Furthermore, the aquaculture systems such as the acadjas established in the lagoon cannot be exploited because the entire surface of the lagoon is covered with the weeds. It is difficult to estimate the cost of these impacts on fisheries activities.

The periodic invasion of the Ebrié Lagoon by these aquatic plants slowed down the activities in the port (difficulties for ferry boats or other boats to move or to dock in the port, obstruction of the fishing port). Periodically, the same problem is observed in other coastal waters where the riverine rural population has some difficulties moving by boat from one village to another. It is also difficult to estimate the cost of these impacts on navigation.

One other notable aquatic invasive weed, the water hyacinth, has thrived to the detriment of native species, thereby upsetting the ecological balance and the biological diversity of the region. The increased loading of the coastal waters with nutrients has provided a conducive environment for the growth of the water hyacinths which has spread and covered all of the surface water in the coastal areas from the Benin Republic in the west to the Cross river

(Nigeria) and to Cameroon in the east. Since the broadcasting in 1985, this phenomenon has attracted the urgent attention of the governments in the region and that of the Economic Community of West Africa States (ECOWAS) with the organization of public seminars with the attendance of experts from within and outside the region. The Governments have accorded the issues of eutrophication and invasive aquatic species topmost priority in their national planning and have set up national committees for its eradication. Unfortunately, little or no progress has been recorded in these efforts to control eutrophication, harmful algal blooms and invasive aquatic species due to the non-adoption of a transboundary and multi-sectoral approach.

Coastal habitats such as shallow estuaries, bays, lagoons and wetlands that are often reclaimed or cleared for habitation, development or agricultural purposes are the most productive nursery grounds for major fish or shellfish. They are therefore critical habitats, which underpin the regenerative capacity of the fishery of the sea (Ibe, 1993). The mangrove forest in the southeastern Niger Delta, estimated to cover approximately 7000km^2 is the largest in Africa and the third largest in the world. It plays a vital role as producers of nutrients in primary and secondary productivity and in supporting biologically diverse communities of terrestrial and aquatic organisms of direct and indirect economic value and transboundary significance.

The mangrove ecosystem and associated wetlands are under pressure from overcutting (for fuel wood and construction timber) and from other anthropogenic impacts (e.g. clearing for aquaculture practise) thereby jeopardising their roles in the regeneration of living resources (which translates into a loss or reduction of fishery resources) and 'custodians' of biological diversity as well as in the restoration of the ecosystem quality (Ibe, 1993). The pressure of a subsistence population has adversely affected these mangroves but the discovery of hydrocarbon in the Niger Delta in the mid 1950s may have been the final straw. However, as a result of the development of large urban centres with significant industrialization and human incursion into the coastal fronts, the extent of these lagoon mangroves has been reduced and several species that could be expected to occur are no longer to be found (Saenger *et al.,*1997). In the last decade or so the Nypa Palm, and exotic species has become distributed throughout the Niger Delta invading and replacing native mangrove species and their associated animal species from many mangrove habitats. Its rapid propagation rate however threatens mangroves further in the region with all known negative consequences. Field assessments carried out during the Pilot Phases Project revealed that the rapidly growing Nypa Palm is presently confined to southeastern Niger Delta. Its rapid propagation rate however threatens mangroves further afield in the region with all the known negative consequences. It has become quite important to clear the invasive Nypa Palm species that has invaded the Niger Delta and degraded its ecosystem and simultaneously restore the original mangrove vegetation as a civic duty to preserve the integrity of this ecosystem with all the promises this actions holds for the shared International Waters and resources of the GCLME.

Table 5.2-3. Ecological Processes and Related Scales of Observation for the Ecological and Environmental Data. Methods Used and Main Results Obtained in Cote d'Ivoire

Ecological process	Scale of observation	Ecological data	Environmental data	Method	Results
Availability	Fortnight	CPUE	SST (coastal, COADS)	Multivariate time series analysis	Depend on enrichment process
School size	Fortnight, month	Catch per set	SST (coastal, COADS)	Regression	Depends on food availability
Seasonal Migration	Month	Catch	CUI, SST coastal and COADS	Comparative dynamics (CUI)	Depend on differential food production
Changes in Migration	Month, annual	Catch	SST coastal, Satellite (Meteosat)	Spatial upwelling index	Depend on yearly strength of the upwelling
Inter-annual abundance	Annual	Catch, CPUE	SST, wind	Climprod (production models GAM)	Depend on availability/Abundance OEW (optimal environmental window)
Long-term abundance	Decadal	Catch, CPUE	SST (coastal, COADS)	GAM, STL (generalized additive models)	Change in the seasonal pattern and in the long term environment
Retention area	Decadal	Eggs and larvae	SST (COADS), satellite	Models (3D, IBM)	Double cell circulation
Reproductive behaviour	Microscale	Individual fish dynamics in space	Global change	Comparative Evolutionary ecology, IBM	Ecology of individuals

(NOTES: CUI= Coastal Upwelling Index; IBM= Individual Based Models; GAM= General Additive Models)

Source: adapted from Roy *et al.*,2002

5.3 Deterioration in water quality (chronic and catastrophic) from land and sea-based activities, eutrophication and harmful algal blooms

Status of the problem/issue

Pollution from Land and Sea-Based Activities has contributed significantly to the deterioration of the water quality of the countries of the GCLME. Domestic and industrial pollutants have mostly been associated with the large coastal cities in the region such as Accra, Abidjan, Lagos, Douala, Port Harcourt and Luanda (see listing of coasltal cities in Table 3.1-1). Most of the industries operating in the region are located in or around the coastal areas and discharge untreated effluents directly into sewers, canals, streams and rivers that end up in the GCLME causing widespread deterioration in the water quality and the health of the coastal inhabitants.

Transboundary elements

Pollution from municipal, industrial and agricultural sources significantly affect transboundary waters and living marine resources of the GCLME. Although most impacts of chronic deterioration in water quality are localised (national issues), they are common to all of the countries and require collective action to address them. Moreover, chronic pollution can favour the development of less desirable species, and result in species migration. Catastrophic events such as major oil spills and maritime accidents can produce impacts across country boundaries, requiring co-operative management and sharing of clean-up equipment and manpower. Eutrophication and HABs occur in most of the sixteen countries, and these face similar problems in terms of impacts and management, and which require collective regional action to address.

Environmental impacts

Environmental impacts of pollution are widespread, and include:

Disease (both human and plants and wildlife wildlife)

Decreased water quality (lower oxygen, lower visibility)

Die-off of coastal plants

Loss of biodiversity

Altered habitat

Loss of recreational resources

Degraded groundwater quality

Pollution of food sources

Socio-economic impacts

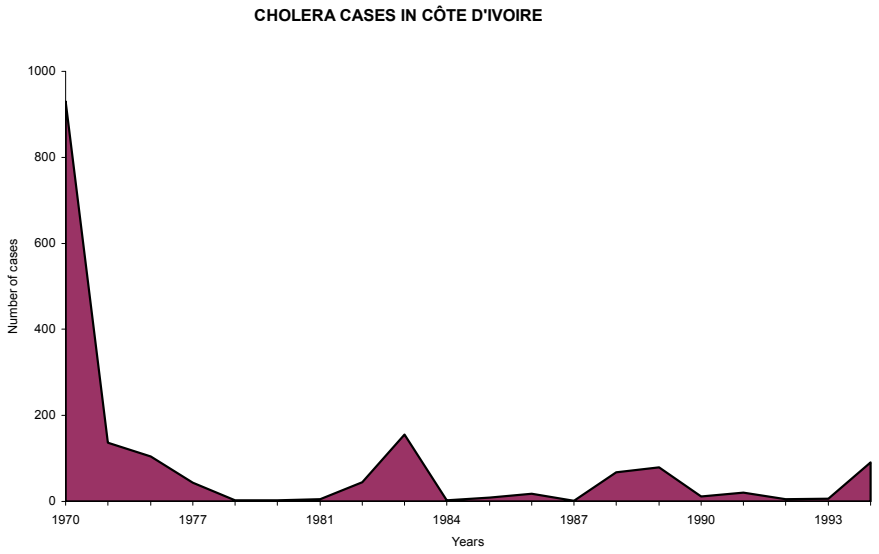
Socio-economic impacts include:

- Loss of subsistence due to decline in renewable coastal resources
- Increased disease due to degraded food sources and water sources
- Reduced sustainability in coastal villages
- Increased pressure on central governments to produce alternative livelihoods for population
- Possible political instability at local or national levels
- Loss of water for cattle and other domestic animals

Domestic sewage and other wastes, but also coastal and upstream non point-sources of pollution from agricultural, forestry and hazardous waste sites constitute sources of contamination of the fresh drinking water and the water quality in general, both for the surface and groundwater resources. Indeed, the water quality degradation is generally associated with health problems because of the presence of pathogens and other micro-organisms, excess of nitrates and persistent organic micro-pollutants, etc. It is clear, consequently, that human interference (with the land-based activities) in the region, superimposed on natural degradation processes in the coastal and marine areas could induce huge disturbances with large impacts in the concerned environments (loss of habitats and productivity and biodiversity, water quality

decline with consequences in the coastal population health, changes in the natural coastal and marine environment equilibrium with frequent, increasing harmful effects; i.e., microbiological and bacteriological contamination in the Korle Lagoon in Ghana and in Ebrie and Lagos lagoons, around Abidjan and Lagos).

Figure 5.3-1. Cholera Cases in Côte d'Ivoire



Source: Abe *et al.,*2000

The major socio-economic impact expected as a result of microbiological pollution is a deterioration of human health (illness and deaths; e.g., Figure 5.3-1). Epidemiological data show the possible implication of the Ebrié Lagoon and its hydro climatic variations on the endemics of some diseases such as Cholera, typhoid. Since 1970, infectious diseases involving bacteria of the Genus Vibrio (such as *Vibrio cholerae, V. parahaemolyticus* and *Aeromonas spp.*) have occurred endemically and sporadically among the riverine population of the Ebrié Lagoon (Dosso, 1984). Kouadio (pers. Com.) shows that pollution of the Ebrié Lagoon's shoreline causes olfactory nuisances to the riverine population that has borne a social cost estimated to be 142.2 million in 1998.

Detailed studies and analysis conducted in the GCLME region and in the entire WACAF region show clearly that sewage constitutes the main source of pollution as a result of land-based activities (UNEP, 1999). All the countries assessed reflect high urban, domestic loads, sometimes from industrial origin, which include BOD, suspended sediments, nutrients, bacteria and pathogens (Tables 5.3-1, to 5.3-3). The annual total BOD for the entire WACAF region including the GCLME was estimated to be 288,961 tons from municipal sewage and 47,269 from industrial pollution, while the annual total suspended sediments (TSS) was estimated around 410,929 tons from municipal sewage and 81,145 tons from industrial pollution. Again, the rapid growth of urban populations is far beyond the capacity of relevant authorities and municipalities to provide basic and adequate services such as water supply, sewage and other wastewater treatment facilities. As a result of these domestic and organic biodegradable material discharges, contamination of the water quality, surface waters as well as shallow aquifers and groundwater, is a current phenomenon, mostly in the sub and peri-urban areas

where the conditions of overcrowding and poverty are increasing with the growing number of people.

The main consequences are: public health risks from the presence of sewage pathogens, eutrophication or oxygen depletion due to excess load of nutrients and organic carbon, as well as contamination of the marine and human organisms through the aquatic food chain. Indeed, in all the confined bays and the near-shore zones around the large cities, such as Conakry or around the most important coastal lagoons in the region (in the Gulf of Guinea with the Ebrie, Togo, Nokoue, Lagos lagoons), the water quality deterioration resulting from the insidious sewage run-off phenomenon, in particular during the rainy season, posed a major risk to the coastal and marine environment and to public health. The chronic lack of hygiene in most of these environments results in an increase in the number of infections among the population. In particular, among children, with the result that epidemics of typhoid, hepatitis and malaria are common.

As agriculture constitutes one of the major sources of income in the region, its intensification (through irrigation and extension to marginal lands) has led sometimes to the excess use of nutrients, pesticides and other herbicides and organo-chlorine substances, including certain forms of POPS. The intensity of the use of POPS varies from country to country depending on the type of agriculture, but they can constitute a source of pollution that may be of importance for the GCLME region. Various examples of POPS use can be found in Benin, Cameroon, Côte d'Ivoire, Nigeria and Sierra Leone. Because of the non-existence of substitutes not only for pesticides, but also for substances against diseases and public health vectors, chlorine insecticides have been used for more than 30 years. This is likely to continue if international efforts to ban them or strictly regulate their circulation and find substitutes are not made.

Oil pollution, which is widespread in the Niger Delta, also results in ecological and public health problems to which women and children are particularly susceptible. The socio-economic impacts of oil spills are enormous.

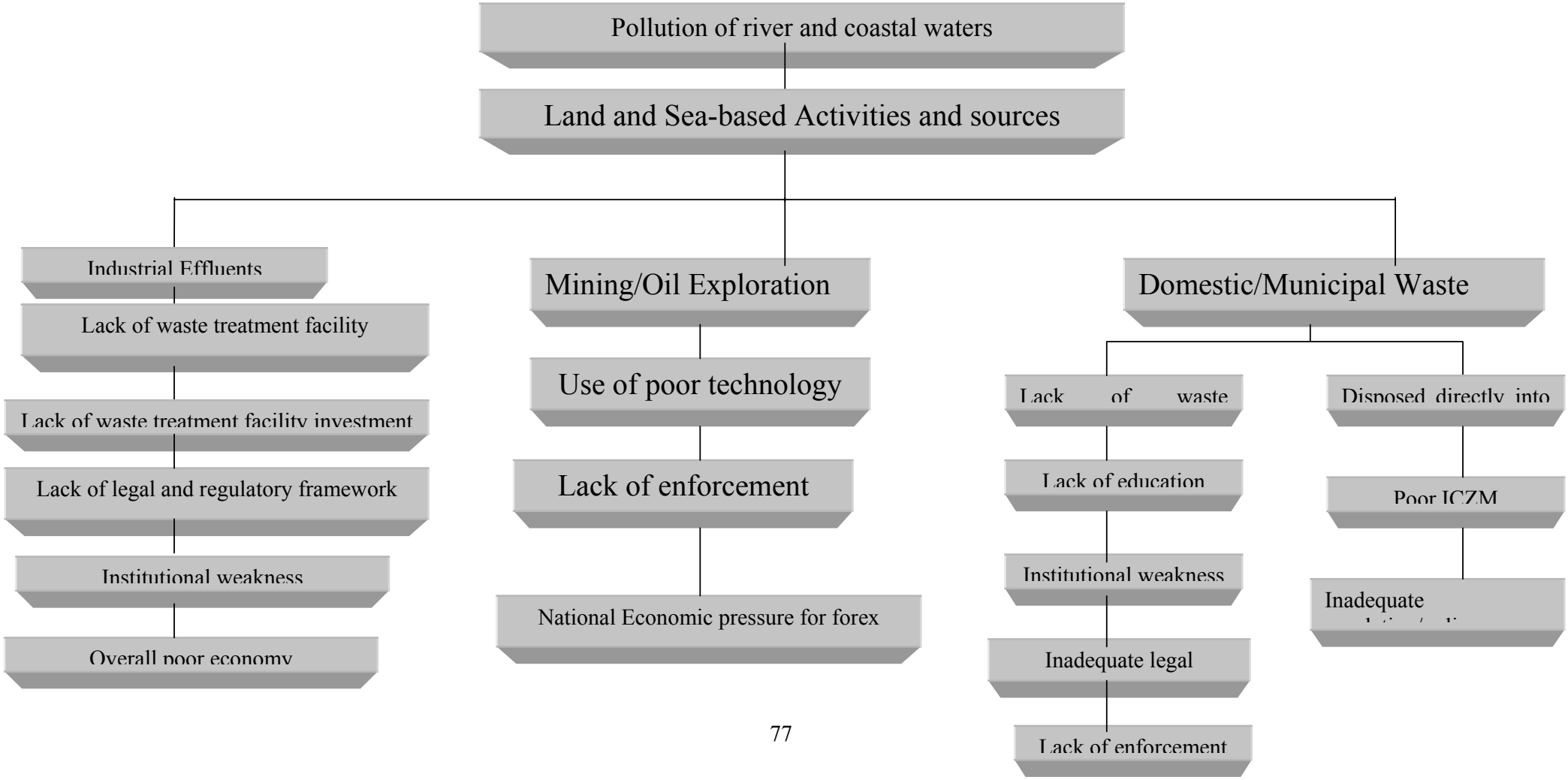
Social disturbances resulting from reactions to oil spills have unquantifiable impacts on the economy of the immediate areas and communities as well as the nation as a whole. Ghana alone, for instance, discharges about 1,400 tons of waste oil daily or 500,000 tons annually, and it is estimated that the entire sub-region discharges about 4,000,000 tons of waste oil into the GCLME annually.

Poverty is also a major contributing factor to the present degradation of the coastal and marine environments in the GCLME, since it constitutes a major impediment to the adoption of new practices or behaviours which are less damaging to these environments. The presence of bilharzia and other water-borne diseases constitutes another important health risk resulting from the deterioration of the quality of water in the freshwater environment. This is due in particular o the changes occurring as a result of the construction of river dams. Good examples can be found in the Volta and Niger river basins

Causal chain analysis

A causal chain analysis was performed to examine the primary, secondary, and root causes of deterioration of water quality.

Figure 5.3-2. Causal Chain Analysis: Deterioration in Water Quality (Chronic and Catastrophic), Pollution from Land and Sea-Based Activities, Eutrophication and Harmful Algal Blooms.



Sectors and Stakeholders

Sectors and Stakeholders involved with declining water quality are broad. Primary sectors include:

Mining

City management

Industry and Finance

Environment

Agriculture

Primary Stakeholders involved with deteriorating water quality include:

Local Government

National government

Fishermen

Farmers

Local villages

Women and children

NGOs

Academia

Supporting Data

Human activities have adversely affected the coastal and marine environment of the region, leading to reduction in the amenity value, loss of biological diversity, and degradation of the water quality, poor sanitation and negative effects on human health. The main sources of pollution in the coastal areas of the GCLME are from Land-Based Activities and include:

"point" sources - municipal wastewater (e.g. sewerage and solid waste) and industrial wastewater containing organic loads, heavy metals and nutrients (e.g table 5.3-5).
"nonpoint" sources - agriculture runoff, such as sediment/silt, salts, and agro-chemicals (pesticides, herbicides, and fertilizers); urban runoff; mining, such as mine dumps, tailings, and chemicals; forestry management (logging and clear cutting increase surface runoff and reduce groundwater replenishment); airborne particulates.

Even though the level of industrial development is still low in the GCLME region, the rate of industrialization is increasing along the coastal areas. As an example, an estimated 60% of the industries in countries bordering the Gulf of Guinea are located in coastal cities (UNDP/GEF, 1993), particularly in Nigeria, Côte d'Ivoire and Ghana. These industries consist of oil refineries, petrochemicals, pharmaceuticals, textile, leather, food & beverage and plastic industries. Mining operations produce large residues that are discharged into coastal waters. For example, large quantities of phosphate residues in Cote d'Ivoire and Togo are discharged from the phosphate industry. Tables 5.3-1 and 5.3-2 show some of the extent of pollution in the GCLME region.

Table 5.3-1. Concentration of Oil and Chlorine Substances in Fishes in the GCLME Coastal and Marine Areas (ng/g, wet weight)

Localities/Species		p,p'-DDE	p,p'-DDD	p,p'-DDT	DDT total	PCB	References
FISHES							
Nigeria		3.72 (0.13-14.70)	0.12 (ND-1.05)		4.37 (0.15-18.60)	40.9 (11.0-225)	Osibanjo and Bamgbose, 1990
Sierra Leone		15 (2-36)		11 (2-30)	46 (7-116)	90 (3-825)	Portmann et al. 1989
Benin		0.23	1.79	1.86	3.88		Soclo and Kaba, 1992
Cote d'Ivoire					1.92 (0.13-4.3)*		Kaba, 1992
Cameroon					89.5 (ND-393)	196 (ND-983)	Mbi and Mbome, 1991
MOLLUSCS AND CRUSTACEANS							
Nigeria	Shrimps, crabs, oysters, snail				37.0 (4.47-152)	94.5 (37-287)	Osibanjo and Bamgbose, 1990
Cote d'Ivoire	shrimps				1.0 (0.17-1.9)*		Kaba, 1992
Cameroon	shrimps				244 (76-540)	342 (ND-705)	Mbi and Mbome, 1991
Cameroon	oyster				113 (ND-181)	209 (ND-716)	Mbi and Mbome, 1991

*) Values converter in weight by dividing original values in dry weight by 3. ND= Not detected

Table 5.3-2. Estimated Quantity of Pollutants Discharged to the Ocean from Industrial Sectors in Some GCLME Countries-Cote d'Ivoire, Ghana, Togo, Benin (Tons per year)

Type of Industry	BOD5	SS	Oil & Grease	COD	Ammonia nitrogen	Phenols	Total chromium	Fluoride	Cyanide	Total Phosphorus
Petroleum refining & handling	537.0	314.2	204.5	1496.3	111.4	2.6	6.8			
Edible oils	1828.6	1599.0	1148.0	4575.6						
Beer	2007.4	930.9		2204.2						
Soft drinks	241.6	332.1		605.9						
Soap & detergents	93.6	159.5	11.2	234.0						
Textiles	684.5	752.2		8519.2		12.1	12.1			
Paint	0.5	0.9		1.5						
Flour	57.7	51.3		144.7						
Diary products	189.0	283.5		483.0						
Fruits & vegetables	82.1	101.3		204.8						
Meat	1.4	2.2	0.7	3.4						
Fertilizer		23525.9	0.9		6.3			2330.8		7063.0
Asphalt	27.8	22.4	9.1	164.1	16.2	0.2	0.5			
Steel		14.4	4.4		36.6	0.6			9.0	
Aluminum		1874.4					0.6	1250.2		
Metal plating & coating		44.6						1.1		2.2
Cement	1355.0			3400.3						
Coffee	1875.0	150.0		4686.0						
Cocoa products	329.7	288.3	207.0	824.9						
Wood products (plywood, veneers, lumber)	13.2			33.2		2.6				
TOTAL	9511.3	31731.5	1585.8	28050.7	1705	181	200	3582.1	9.0	7065.2

Source: UNEP, 1982. Regional Seas Reports & Studies. No 2.

Both the increasing rates of the urban population growth (with an average 4-7% growth rate; see Table 3.1-1) and the industries have created negative synergies in terms of human and environmental impact on the coastal regions. A variety of types of pollution from sewage, garbage, industrial and solid waste disposal, oil spills from shipping operations can be found in increasing amounts in the coastal waters (Tables 5.3-3 through 5.3-5). The deterioration of water quality is one of the most important aspects of environmental degradation occurring in the coastal, marine and freshwater areas in the WACAF region. This deterioration is exacerbated by the often-untreated domestic sewage and industrial effluents being discharged directly into coastal waters. The total annual biochemical oxygen demand (BOD) load from municipal sewage was estimated in 1984 to be 62,535 tons in the northern zone, 205,612 tons in the middle zone and 20,314 tons in the southern zone (Table 5.3-4)

Table 5.3-3. Domestic Waste and Waste Statistics of Some GCLME Countries

City- Country	Per capita water used/day	Wastewater treated %	Per capita solid waste generated %
Luanda- Angola	50	0	-
Porto Novo- Benin	22	-	0.5
Douala- Cameroon	33	5	0.7
Yaounde- Cameroon	61	20	0.8
Abidjan- Cote d'Ivoire	111	58	1.0
Libreville- Gabon	100	0	-
Accra- Ghana	4	0	0.4
Conakry- Guinea	50	0	0.7
Lagos- Nigeria	80	-	1.1
Lome- Togo	35	-	1.9

Table 5.3-4. Estimated Amount of Municipal Sewage in Comparison with Industrial Pollution in the WACAF Region Including the GCLME Countries

ZONES	Estimated population*** 1000*	Municipal sewage				Industrial pollution			
		BOD5 t/year	%*	SS /year	%*	BOD5 t/year	%**	SS t/year	%**
Northern	17.350	62.535	21.6	88.930	21.6	15.320	24.5	18.542	20.8
Middle	117.960	205.612	71.1	292.401	71.1	29.962	14.6	61.243	20.9
Southern	36.800	20.814	7.3	29.598	7.3	1.986	9.5	1.360	4.6
TOTAL	172.110	288.961	100.0	410.929	100.0	47.269	16.3	81.145	19.7

* Percentage of the total amount of municipal sewage in the Region

** Percentage on industrial pollution of the amount of municipal sewage in certain zones

*** Estimated population of the Region, but without Mauritania, Cape Verde and Namibia (Africa South of the Sahara.

Source: UNEP, 1984 Regional Seas Reports and Studies, 4

From industrial pollution, total annual BOD for the region was estimated for the same period to be 47,269-tons (Table 5.3-2). Various analyses of the water have shown that most of these discharges contain a heavy load of nutrients, pathogens, microorganisms, organic material, sedimentary particulates, and also trace metals and synthetic compounds. This type of pollution may be even more severe and have more negative impacts around the most industrialized large urban cities: Lagos, Abidjan (Tables 5.3-8 and 5.3-9), Conakry, Accra, etc. Indeed, in these large cities, most of the pollution originates from BOD5 (12%), total suspended sediments (21%) and

chemical oxygen demand (COD, 46%). That these effluents affect the environment can be seen in biota (e.g., Table 5.3-10).

Organic pollution has resulted in eutrophication and, as reported for the Korle and Chemu II lagoons in Ghana and several bays of the Ebrie lagoon in Cote d'Ivoire, in nea total oxygen depletion (Table 5.3-7, Acquah, 1998a; Ajao, 1996; Awosika and Ibe, 1998; Biney, 1994; Dufour *et al.,* 1985 & 1994; Gordon, 1998; Guiral, 1984; Guiral *et al.,* 1989). Nutrient loading has direct impact on productivity, fisheries and water quality and is central to the general ecological functioning of the coastal ecosystem. This is especially true of the GCLME region where nutrient loading of the coastal water bodies has had a direct negative impact on the fisheries and water quality and caused outbreaks of water-borne diseases (Acquah, 1998a; Ajao and Anurigwo, 1998; Dosso *et al.,*1984; Duchassin *et al.,* 1973; Dufour *et al.,* 1985; Kouassi *et al.,* 1990; Metongo *et al.,* 1993). The lack of oxygen on the bottom of shallow areas impacted by eutrophication has also led to massive loss of bottom-dwelling animals. For instance, eutrophication of Nigeria's coastal lagoons, rivers and streams induced the explosive growth of water hyacinth in the early 1980s covering nearly 800km and severely impeding fishing activities and transportation. The 1990 World Bank estimate for water hyacinth control in Nigeria is US$ 50 million annually.

Table 5.3-5. Pollutant Load and Discharges from Sewage and Domestic Effluents in Cote d'Ivoire

	Discharges Volume (m^3/year)	**BOD[5] t/year**	**DOC t/year**	**TSS t/year**	**Nitrates t/year**	**Phosphates t/year**
Houses connected in the sewer system	67.500	18.222	40.700	18.500	3.052	370
Houses not connected in the sewer system	97.100	91.797	212.864	212.864		
Total	164.600	110.019	253.564	231.364	3.052	370

Source: Metongo, 1997

Table 5.3-6. Bacteria Concentration in the Urban Lagoonal Environment in Abidjan

Parameters	**Indicator**	**Concentrations**	
		Maximum	**Minimum**
Fecal Streptococcus	Bacteria number/ 100ml	10.000	0
Fecal Coliforms	Bacteria number/ 100ml	100.000	0
Total Coliforms	Bacteria number/ 100ml	100.000	100

Source: Adingra and Arfi, 1997

Table 5.3-7. Typical Levels of Organic Pollution of Some of the Coastal Lagoon Systems in the GCLME

	Korle Lagoon, Accra[1]	**Chemu II Lagoon, Tema[1]**	**Lagos Lagoon, Lagos[2]**	**Ebrie Lagoon, Abidjan[3]**	**Background[4]**
DO (mg/l)	0-6.2	0-0.5	2.2-9.5	n/a	6.4-6.6
BOD (mg/l)	4.4	71.2-240	n/a	n/a	3.2-5.5
PO_4-P (mg/l)	0.86	0.59-2.85	<0.01-0.5	0.06-0.27	0.06-0.09
NH_4-N (mg/l)	3.8	1.3-12.6	-	0.18-1.11	0.2
NO_3-N (mg/l)	n/a	0.2-0.35	0.1-0.8	0.01-0.28	n/a
Total coliform	635-1,604	n/a	n/a	0-1,735	n/a

(No./100 mlx 1000)					

[1]Sources: Biney (1994) and Acquah (1998a); [2]Sources: Ajao (1990), Kusemiji et al. (1990) and Oyewo (1999); [3]Source: Affian (1999); [4]Values measures for unpolluted lagoons in Ghana (laloi and Mokwe lagoons), according to Biney (1994). n/a: No (reliable) data available.

Table 5.3-8: Effluent Quality of Some Industry-Specific Discharges into Odaw River and Korle Lagoon Catchment, Accra, 1994/1995

Pollution Indicator	Food and beverages Industry	Chemical Industries Guidelines	World Bank Guidelines
Biological Oxygen Demand (BOD) mg/l	240-4,260	1.0-380	50
Chemical Oxygen Demand (COD) mg/l	700-30,200	24-6,200	250
pH	4.0-11.04	6.7-7.6	6-9
Conductivity (µs/cm)	2.18-4,600	486-562	
Oil & Grease (mg/l)	29-108	24-27	10
Ammonia NH_4 (mg/l)	1.2-70.5	0.48-10	
Temp.	25.7-41.8	-	

Source: EPA Monitoring Results, Accra (1994/1995)

The agricultural run-off from the irrigation patterns in the river valleys and flood-plains (i.e. interior Niger delta, Volta delta, etc.), including the elevated concentrations of nutrients and pesticides also contribute to increased eutrophication in the estuaries, deltas, coastal and freshwater environments in the GCLME. Moreover, the use of a wide range of persistent organic pollutants (POPs), although the most dangerous of these are banned, including DDT, aldrin and dieldrin and other organo-phosphorous pesticides, increase the water pollution in the region. River inputs carry considerable amounts of sediment as a result of soil erosion and deforestation, which contribute to the siltation of coastal habitats and the decline of water productivity. This phenomenon, combined with the pollution loads, may explain the considerable problems encountered now in most of the freshwater aquatic areas, such as the Côte d'Ivoire, Nigeria and Benin coastal lagoons, with the presence of significant seasonal invasive aquatic weeds.

The other main source of pollution from land-based activities in the GCLME region is contamination by litter, solid wastes, plastics and other marine debris which threaten marine life, degrade the visual amenities of marine and coastal areas and has negative effects on tourism and general aesthetics (table 5.3-11 and 5.3-12). This is particularly frequent along the beaches of the main GCLME large cities: Conakry, Abidjan, Accra, Lagos, Luanda, and Douala. This situation is a direct consequence of the growing population densities and their increasing poverty, as well as the difficulties for the local municipalities and governmental authorities to continue to provide the populations with adequate basic services (i.e. solid waste final disposal). The loads of trace and heavy metals, oils, hydrocarbons, including other synthetic organic chemicals micro-pollutants out of industrial wastes and effluents, ports and harbours in the Gulf of Guinea is becoming more and more a source of concern for the ecology and the health of the environments. All these major (point and non-point) sources of degradation from land-based activities show that norms, adequate legislation, reduction of the various types of waste, discharge treatments, follow-up campaigns as well as public education and awareness are an absolute need for the GCLME

region. To this end, the formulation of realistic and coherent strategies, which aim at preventing the degradation of the freshwater, coastal and marine environments from land-based activities, must be a high priority for the region.

Table 5.3-9. Typical Levels of Heavy Metal Pollution in Some of the Coastal Lagoon Systems in the GCLME

Sample	Cd	Cr	Cu	Fe	Hg	Mn	Pb	Zn	Reference
Sediment (ug/g dry wt)									
Lagos Lagoon, Lagos	0.01-15.5	2.9-167	1.5-132	510-85548		98-2757	0.4-483	7.8-831	Okoye *et al.,* 1991, Oyewo, 1999
Ebrie Lagoon, Abidjan		20.7-465	3.0-76.3	1.3-67.0	0.05-0.49	24.0-534	4.0-88.8	5.5-398	Arfi *et al.,* 1994
Unpolluted sediments	0.2-5				0.01-0.08		8-60		GESAMP, 1985 & 1998
Water (mg/l)									
Korle Lagoon, Accra (median)	0.24		0.31				0.08	0.08	Acquah, 1998b
Lagos Lagoon, Lagos (median)	0.002		0.003	0.086		0.021	0.009		Okoye, 1991a
Natural sea water levels	0.005		0.003				0.003	0.02	Acquah, 1998b
Shellfish (ug/g fresh wt)									
Lagos Lagoon, Lagos (median)	0.18		23.6				5.1	240	Okoye, 1991b
Ebrie Lagoon, Abidjan	0.35-0.95		17.5-33.5		0.07-0.19			608-2115	Metongo, 1991
WHO standard	2		30		2		2	1000	Kabulu *et al.,* 1987

Table 5.3-11. 1996 international coastal clean-up results for some countries in the GCLME

Country	Debris Collected (pounds)	Debris collected (kg)_	Length of beach cleaned (miles)	Length of beach cleaned (km)
Cameroon	16,328	7,422	1.2	0.7
Cote d'Ivoire	5,005	2,275	1.4	0.9
Nigeria	3,121	1,419	2.5	1.6

Source: Awosika, 2002 in LOICZ Reports & Studies No. 25

The coastline of the GCLME region lies to the east and is downmind of the main route of oil transport from the Middle East to Europe. The total volume transported annually along the GCLME, for example, has been estimated to be $706X10^6$ tonnes (Portmann, 1978) and the discharge of tank washings from offshore traffic is a significant source of oil on beaches. However, much of the oil found on beaches is from spills or tank washing discharges from tankers visiting ports in the region (Portmann *et al.,*1989).

Significant point sources of marine pollution have been detected around coastal petroleum mining and processing areas, releasing quantities of oil, grease and other hydrocarbon compounds into the coastal waters of the Niger delta and off Angola, Cameroon, Congo and Gabon. In the Ebrie Lagos in Cote d'Ivoire (Marchand and Martin, 1985) a wide range of concentrations (1000-24,000 mg/kg) of total hydrocarbons was found in lagoon sediments. The highest concentrations were associated with industrial and domestic sewage discharges. However, a spill of 400 tonnes of oil at a refinery in 1981 was still clearly detectable in 1983 (Portmann *et al.,*1989). The number of offshore platforms and various export/import oil terminals means an inevitable exposure to oil pollution. About 30% of the approximately 27 oil refineries in the Africa region are located along the coastline. In the largest oil producing countries, such as Nigeria, Gabon, and Angola (Table 5.3-12), production is heavily concentrated in offshore and shoreline installations (World Bank Report, 1994). According to the World Bank (1995), oil producing companies in Nigeria alone discharge an estimated 710 tons of oil yearly. An additional 2100 tons originate from oil spills. The patterns of onshore-offshore winds and ocean currents mean that any oil spill from any of the offshore or shore-based petroleum activities translate easily into a regional problem. Most of the countries also have important refineries on the coast, only a few of which have proper effluent treatment plants, thereby adding to the threat of pollution from oil.

In summary (Table 5.3-13), the major contaminants in the GCLME originate from various domestic discharges and run-offs (including markets, hospitals, etc.), as well as industrial facilities (from breweries, food, textile, wood processing). Domestic sewage and other wastes, but also coastal and upstream non-point sources of pollution from agricultural, forestry and hazardous waste sites constitute sources of contamination of the fresh drinking water and the water quality in general, both for the surface and groundwater resources. Indeed, the water quality degradation is generally associated with health problems because of the presence of pathogens and other microorganisms, excess of nitrates and persistent organic micro-pollutants, etc. Oil, gas and related products predominate in the some countries in the GCLME, and partly along the Nigerian, Gabonese, Congolese, and Angolan coasts, where beach pollution by oil in the form of tar balls and oil spills is frequently observed.

Table 5.3-13. Main Contaminants and Their Sources in the GCLME Region

POLLUTANTS	PRODUCING INDUSTRY	%
BOD5 (12 %)*	Beer Edible oils Textiles Total	22.0 17.3 15.9 55.2
SS (20.7 %)	Fertilizer Textiles Edible oils Total	29.5 23.6 8.8 61.9
Oil + grease (18.4 %)	Petroleum refining Edible oils Total	90.0 7.1 97.1
COD (45.7 %)	Textiles Edible oils Beer Total	52.0 11.4 7.7 71.1
Ammonia nitrogen Phenols	Petroleum refining Textiles Wood products Total	90.7 37.2 31.9 69.1
Total chrome	Leather Textiles Total	33.5 33.0 66.5
Fluoride	Fertilizer Aluminium Total	59.9 40.0 99.9
Cyanide Total phosphorus	Steel and fabrication Fertilizer	100.0 100.0

* Estimated mass of pollutant as a percentage of the total amount of pollutants released to the Region.
Source: UNEP, 1984. Reg. Seas Rep.& Studies. 46

Results from various studies indicate that as far as pollution from land-based activities is concerned, the major emerging issues and problems in the GCLME region could worsen in the near future if preventive and adequate measures are not taken. Those issues are linked to:

Increasing sewage and solid wastes of domestic origin and their effects on public health and water quality decline;

More and more intensive use of nutrients, pesticides, other herbicides and organo-chlorine substances;
Increasing trace metals, oils, hydrocarbons, including other synthetic organic chemicals micro-pollutants, from industrial activities, ports; and, to an ever increasing extent;
Atmospheric pollution resulting from gaseous and particulate emissions, from industries and vehicles.

5.4 Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes, coastline erosion

Status of the problem/issue

The physical destruction of coastal habitats, including critical wetlands in the GCLME, is causing the loss of spawning and breeding grounds for most living resources in coastal waters and the loss of the rich and varied fauna and flora of the region including some rare and endangered species. Much of the destruction is related to often-haphazard physical development, which exert phenomenal pollution pressures on this international body of water (WACAF Intersecretariat Co-ordination Meeting, Rome, 1993). Coastal geomorphological change, erosion and sedimentation have been identified as having a significant and progressive impact in all the countries in the GCLME, the problem being acute on the lagoon systems.

Human settlements are regarded as a major contributor to eutrophication and the occurrence of aquatic weeds in the GCLME and its marine catchment basins. Nearly all major cities, agricultural plantations, harbours, airports, industries as well as other aspects of the socio-economic infrastructure in the region are located at or near the coast. Results obtained during the Pilot Phase GOG-LME Project showed that in Ghana, 55% of the mangroves and significant wetlands around the greater Accra area have been decimated through pollution and overcutting. In Benin, the figure is 45% in the Lake Nokoué area, in Nigeria, 33% in the Niger Delta, in Cameroon, 28% in the Wouri Estuary and in Côte d'Ivoire, about 60% in the Bay of Cocody. A mangrove environment characterizes the Congo Democratic Republic coast, which extends for 37 km along the Atlantic Ocean. The production of charcoal from mangrove woods and the pollution caused by hydrocarbon discharge generate serious problems for these forms of critical habitats. The mangrove losses have been estimated at almost 40% of the total surface mangrove areas at the mouth of the Congo River (UNEP, 1999).

Transboundary elements

Although most impacts may appear localised, habitat alteration or loss due to fishing, coastline erosion and crude oil extraction and mining can cause migration of fauna and system-wide ecosystem change. Uncertainties exist about the regional cumulative impact on benthos resulting from coastal erosion, mining and associated sediment re-mobilisation. Moreover, certain mining activities including sand mining and crude oil exploration and extraction are conducted close to national boundaries and negative consequences may be transmitted across into the adjacent country's EEZ. Inadequately planned coastal developments result in degradation of coastscapes and reduce the regional value of tourism.

Environmental impacts

Loss of habitat

Loss of nursery grounds leading to declining productivity

Loss of Biodiversity

Loss of Fisheries resources

Change in land use

Socio-economic impacts

Major socio-economic impacts include:

Loss of livelihoods
Increased poverty
Lack of social stability
Possible political unrest
Starvation
Increased disease
Displacement of villages/populations

Coastal vegetation in the region has been decimated by both natural and anthropogenic activities to the extent that a large percentage of the primeval vegetation has been replaced with new species. Modification of the ecosystem in Nigeria, for instance, is a result of man-made and natural activities. While 30% of the modification is caused by natural activities, the remaining 70% are caused by man-made activities (Awosika *et al.,* 2001). The natural causes of the modification are storm surge, sea-level rise, salt-water intrusion, subsidence and flooding. The man-made causes are changes in land development and unsustainable exploitation of ecosystem resources. These causes are linked to activities in eight sectors, namely urbanisation (25%), energy production (5%), fisheries (10%), agriculture (15%), mining (10%), fishery (15%), industry (10%) and leisure/tourism (10%). Activities that result in changes in land development are linked to urbanisation (25%), agriculture (15%), mining (10%) and forestry (15%) sectors (Awosika *et al.,* 2001). As of 1980 about 60% of the mangroves in Guinea and nearly 70% of the mangrove vegetation in Liberia were reported to have been lost (Awosika, 2002). The hardy grass Paspalum vaginatum has now replaced the original mangrove vegetation in these countries.

Coastal erosion is the most prevalent coastal hazard in the GCLME region. In Nigeria, coastline erosion causes serious concerns because it uproots coastal settlements, decimates agricultural and recreational grounds, destroys harbour and navigation structures, dislodges oil producing and export handling facilities and upsets the hydrological regime in the coastal areas (Ibe, 1988). The same scenario is evident in all the other countries of the GCLME. Although natural causes like low coastal topography, high wave energy and nature of sediment are responsible for these high rates of erosion, anthropogenic activities such as construction of harbour protecting structures, jetties, beach sand mining, construction of dams upstream and deforestation are mostly responsible for the high rates of erosion. Harbour construction activities have altered longshore current transport of sediments and in many cases have led to major erosion and siltation problems. Erosion rates caused by port structures in Liberia, Togo, Benin and Nigeria sometimes reach a staggering 15-25 m per year and threaten infrastructure and services (Ibe and Quelennec, 1989). Typical areas of erosion include:

Guinea: Murdy and Sexton (1986) reported erosion phenomena in the northern part of Camagenne Peninsula. Widespread erosion has also been reported along the Koba area especially at the mouth of the canals dug to drain excess water from the rice fields to the ocean;

Sierra Leone: Collins et al. (1983) reported widespread erosion between Freetown and the eastern border especially off Sherbro Island;

Liberia: Coastal erosion along the Liberian coast has been reported around cities like Buchaner, Greenville, Harper and Robertsport. Around the Organization of African Unity (OAU) Beach, Shannon (1990) reported erosion rates of 3 m annually;

Cote d'Ivoire: The La Vigie area with its coastal residential area of "Les Tourelles"and Adjoufun suffered extensive damage from erosion and flooding during the summer storms of 1984. Koffi et al. (1990) reported coastal erosion rates of 1-2 m annually along the southeastern coast (Fresco, Vridi, Port Bouet to Ghana border). High erosion rates have been reported in the areas off the Abidjan harbour;

Ghana: Along the Labadi Beach, an erosion rate of 3 m per year was reported in the years 1966 to 1975. At Ada near the Volta estuary erosion rates of 2.2 to 2.4 m annually have been reported between 1939 and 1976. Along the Keta coast, erosion rates of 4 m to 6 m per year between 1923 to 1975 have also been reported;

Togo: East of the Lome harbour an erosion rate of 20 m per year has been reported while the updrift western side has accreted so much that it is threatening to silt up the entrance to the Lome port. The coastal road at Amelo has also been washed away as a result of the erosion;

Benin: Erosion is very prevalent along Grand Popo, Seme and east of the Cotonou harbour. According to Adams (1990) erosion was sparked off by the construction of piers around the coastal areas of Kpeme factory, Aneho town, L.M. Hotel and Hotel da Silva. The New Town scheme, which was supposed to be a residential "Hollywood"of Benin, has been devastated by erosion. Many of the roads, houses and other facilities constructed for the residents now lie under the sea;

Nigeria: Erosion rates of 25 to 30 m annually have been documented along Victoria Beach in Lagos (Ibe et al. 1984). Although about six sand nourishment projects, including one completed in 2001, have been implemented on the beach since 1958, erosion continues to wash off large parts of the coast. Other areas where erosion has been very devastating along the Nigerian coast include Forcados 20 m per year, Brass 16-19 m per year, Eket 10-13 m per year and Awoye along the Mahin mud beach 20-30 m per year (Ibe, 1986).

Losses of biodiversity or biological functioning witnessed in the GCLME have also been related to complex ranges of human and natural drivers fuelling habitat degradation and alteration and coastal erosion. The concerns about the hazards and economic loss occasioned by erosion have resulted in intermittent calls for countries of the region with the assistance of donor agencies to adopt one or more of the known coastal erosion defence measures to stem the phenomenal retreat of the coastline (Ibe, 1988). Actions to control erosion around these ports are critically important to maintaining their vitality as sites for growing tourist, recreational, commercial and defence needs. Efforts in the past at abating the nuisance of erosion of the coastline consisted mainly of sand replenishement programmes (especially in Nigeria) using sand either from forshore or the backwaters. These failed to solve the problem as erosion has continued to devastate the coastline beyond pre-nourishment limits (Ibe, 1988). A review of the situation in Nigeria by Ibe (1988) has traced the failure of this measure to an inadequate knowledge of the inter-relationship between nearshore ocean dynamics and shoreline evolution along the Nigerian coast.

Table 5.4-1. Average Annual Erosion Rates and Study Sites* along the Nigerian Coastline Computed from Results of Historical Studies and/or Beach Profiling

Location	Rates of erosion per year (m)
Badagry Beach (Lagos State)	2-6
Victoria Beach (Lagos State)	25-30
Awoye/Molume (Ondo State)	20-30
Ogborodo/Escravos (Bendel State- now Delta State)	18-24
Forcados ((Bendel State- now Delta State)	20-22
Brass (Rivers State- now Bayelsa State)	16-19
Ibeno-Eket (Akwa Ibom State)	10-13

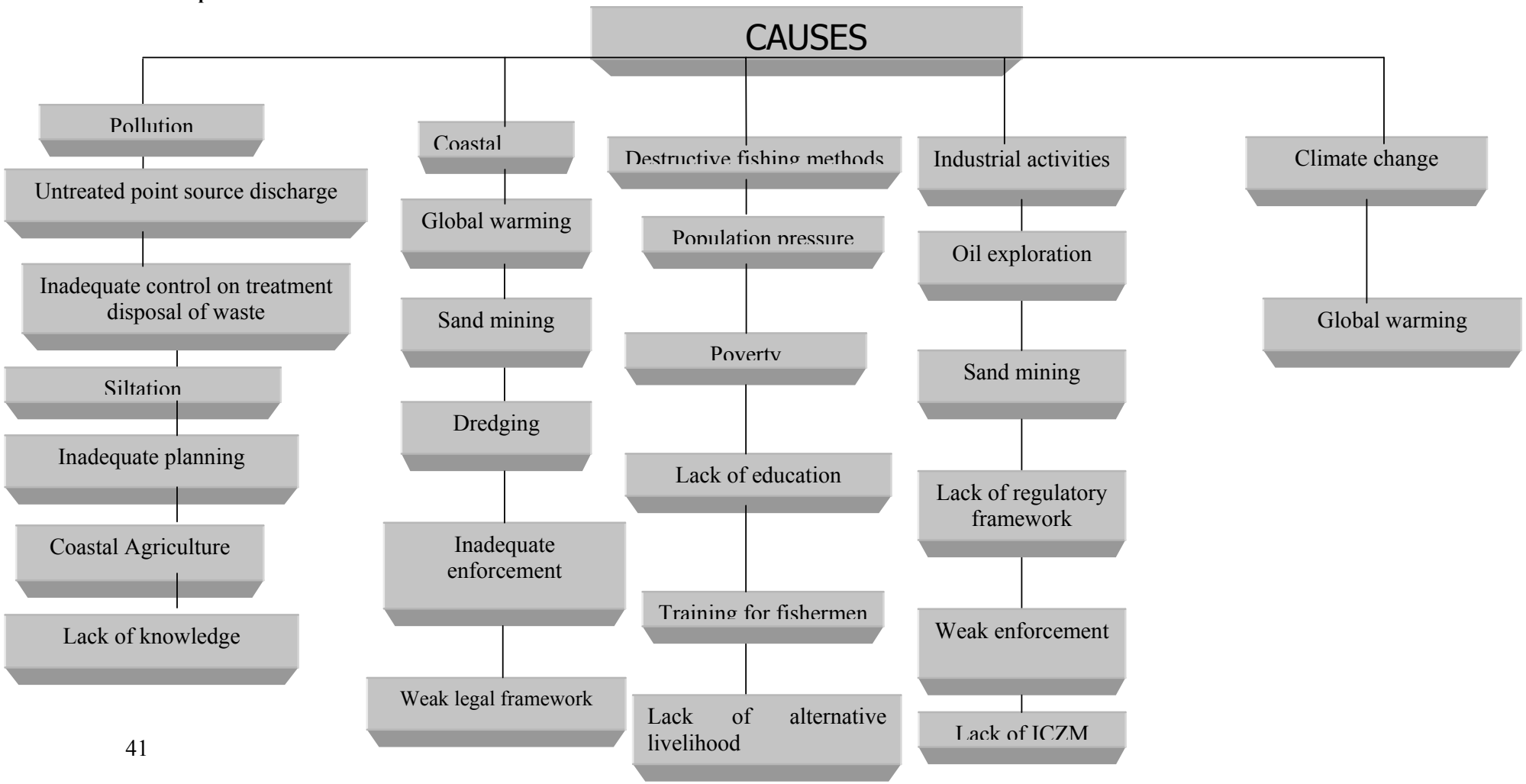
Source: Ibe, 1988

* Periodic sandfilling of the beach in some of these locations e.g. Victoria Beach and Forcados has prevented them from becoming disaster areas.

Causal chain analysis

A causal chain analysis was performed to determine the primary, secondary, and root causes of habitat destruction and alteration.

Figure 5.4-1. Causal Chain Analysis: Habitat Destruction and Alteration, Including inter alia Modification of Seabed and Coastal Zone, Degradation of Coastscapes and Coastline Erosion



Sectors and stakeholders

Major sectors include:

- Industry
- Power and Electricity (dams)
- Water use (dams, river modifications)
- Agriculture and fisheries
- Industry and finance
- Transport

Major stakeholders include:

- Local governments
- National governments
- Fishermen and farmers
- Local communities
- NGOs
- Industry
- Agriculture

Supporting data

The Gulf of Guinea region has one of the highest population growth rates in the world leading to population explosions in the cities. Stemming from the region's early association with the Europeans and its history of trade using the oceans, most of the capital cities are within or around the coastal areas. The cities have also been major attractions for industries as well as for migrant workers, fuelling rapid rural to urban migration and increasing the populations in the coastal areas with all its adverse impacts on the resources of the area. These developmental activities are leading to major changes and pressures from an increasing population in the coastal areas of the GCLME have resulted in habitat degradation and alterations including loss of biological diversity and productivity, pollution and degenerating human health.

The most obvious of these developmental changes are the actual construction of towns with associated industries and the creation or extension of sea ports (Portmann *et al.,*1989). Although these are confined to a few locations they are frequently close to areas that are or could be exploited as tourist centres and there have been instances where hotels have been constructed and then affected by expanding towns or coastal erosion brought about by port developments.

One of the severely affected habitats is the mangrove ecosystem. The GCLME region is endowed with large expanse of mangrove forests scattered all over the region. The mangrove ecosystem of the Niger Delta in Nigeria is the third largest in the world providing spawning and breeding grounds for many transboundary fish species and shrimps in the region. The mangrove forests in the region presently are under pressure from over-cutting (for fuel wood and construction timber) and from other anthropogenic impacts (e.g. pollution), thereby jeopardizing their roles in the regeneration of living resources and as reservoirs of biological diversity (Ukwe *et al.,*2001). Mangroves are also being affected by erosion, either directly or indirectly, by changes in salinity and through the construction of canals. The canals, intended for use as transport pathways, have increased suspended solids in the water leading to destruction of some benthic fauna. This is followed by more permanent damage as the hydrological regime as salt intrusion occurs and the spoil banks impede land run-off.

There are substantial numbers of coastal protected areas in the GCLME region, although for many it has been difficult to determine how far the boundaries extend and to distinguish whether marine elements are included. Nevertheless, an attempt has been made to identify

those having some marine focus and which are primarily coastal land (World Bank/IUCN, 1995). There are no known marine or coastal protected areas in Benin, Ghana, Guinea, Liberia, Nigeria and Togo. Several countries in the GCLME such as Ghana and Guinea have designated Ramsar sites, although they have no formal protection.

Nearly all the main rivers of the Guinea Current region have been damned in at least one location, most of them in the last twenty years or so (UNEP/UNESCO/UN (DIESA), 1985). The dam on the Volta River, for instance, eliminated the regular flooding in the wet season and as a consequence several lagoons, which used to be refilled in times of flood, have been lost (Portmann *et al.,*1989). A particular concern in the region has been the effect on sediment transport to the sea. In Nigeria, for instance, there are now eleven River Basin Authorities manipulating the hydrological cycles and it is estimated that the construction of their dams has resulted in a 70% loss of sediment catchment area due to the effective entrapment of silt behind dams (Leeming, 1985; Olofin, 1985). In some cases the loss of sediment input is blamed for coastal erosion that has occurred since the construction of some dams. A particularly serious case followed the damming of the Volta River with the partial disappearance of the town of Keta (UNEP/UNESCO/UN (DIESA), 1985). Similar problems have been reported in the Niger Delta of Nigeria (McDowell *et al.,*1983; Ibe and Antia, 1983).

Table 5.4-4. Dams in Nigeria Summarized by State

State	Number of Dams	River
Anambra	4	Nkisi, Effiwa, Abina, Ezamgbo
Bauchi	6	Zala, Jamara, Gongola and 3 others
Bendel	3	Oyeni, Ikpoba, Orle
Benue	1	Benue
Borno	2	Ngadda, Yedacram
Cross River	1	Abep
Federal Capital Territory	1	Usuma
Gongola	1	Mayozanpola
Kaduna	17	Tubo, Galma (2); Damari, Tagrai, Dutsin ma, Kusheriki, Galma, Kangimi, Bomo (2), Gurara, Kubani, Sokoto, Tura, Raffin, Jamuna, Kurmin Bi, Chidaviki
Kano	30	Watari, Jakara, Gari, Kara, Baguada, Karaja, Kano, Guzu, Magada, Challawa, Tomes, Tuwari, Dudurun Warrada, Jalau, Tuwara, Kanya, Marashi, etc
Kwara	5	Oyun, Erigi, Oyi, Kampa and 1 other
Niger	13	Chauchanga, Lugai, Iku, Etswan, Oba kegi, Datatisaini, Dinya, Niger, Enika, Kontagora
Ogun	2	Ona, Oyan
Oyo	20	Ebu, Soro, Osse, Omi, Yegun, Oshun (2), Ona, Fofo, Ayida, Opeki, Erinle, Awon, Ofin, Oba, Ara, Alge, Omi, Ogun
Plateau	9	Idyem, Shen, Ravin sanyi (2), Kwalgwal, Lamingo

Sokoto	17	Niger, Sokoto, Gar mache, Rima (2), Tributary to River Gagara, Karaduwa, Gada (2), Kurfi (2), Gagoro, Kigo and 2 others

Source: National Inventory on Dams issued by the Department of Water Resources in 1986. Ibe, 1988.

NOTES:

1) Four states Imo, Rivers, Lagos and Ondo have no registered dams. Two States Katsina and Akwa-Ibom carved out of old Kaduna and Cross River States in September 1987 had not been created when this list was compiled.

2) A vast majority of the dams are earth dams, others are concrete.

3) Most of the dams are for water supply and irrigation. Some are for Fishery and Recreation purposes. Others are multipurpose.

The reduction of freshwater and sediment discharge in the lower estuarine reaches of the rivers due to dam construction have altered the extent of intrusion of the estuarine salt wedge inland. This has important ecological effects on the flora and fauna of the coastal and nearshore zone in the region. Ibe (Pers Comm.) pointed out that the reduction in freshwater flow has been accompanied by a reduction in inputs of nutrients to the coastal areas leading to significant losses in local fish catches from some parts of the Nigerian coast. A further, more specific instance followed the impoundment of the Volta River in Ghana in which the alteration in the salt wedge intrusion resulted in the displacement seawards of the economically important bivalve *Egeria radiate* by about 20 km (Ennin and de Graft-Johnson, 1977) in the first decade after completion of the dam. Breeding grounds now occur less than 10 km from the sea (Portman *et al.,* 1989). Other effects noticed include the seasonal spread of freshwater vegetation such as *Vallisneria aethiopica, Potomogeton octamebers and Ceratophullum demersum*, as well as the snail hosts of *Schistosomiasis* (Odei *et al.,* 1981).

Another important anthropogenically-induced alteration of land is brought about by reclamation of coastal marshland areas (Portman *et al.*, 1989). In 1984 alone, extensive dredging of the Lagos estuary and the deposition of the spoil in adjoining mangrove swamps led to high suspended solids in most of the embayment and severe damage to the oyster fisheries (Ibe, Pers. Comm.). The development of port facilities, especially jetties and breakwaters, and the construction of oil rigs for exploration and exploitation of crude oil have interrupted long-shore drift patterns causing striking coastal erosion problems. For example, at Lagos in Nigeria, Victoria Beach has been eroded 2 km inland since the breakwaters were completed in 1912 (Ibe, 1985). Equally striking is the erosion of 0.5 km at Escravos (also in Nigeria) since breakwaters were completed in 1964 (Ibe, 1986). Similar problems were created at the Port of Abidjan when the Canal de Vridi was opened in 1950; since then the beach has eroded to the east of the canal and a road has been cut through (Portmal *et al.,*1989). Similar serious erosion problems have been reported in Benin, Togo, Sierra Leone and Liberia (Abban, 1986). Coastal areas in the GCLME region are thus, experiencing coastal degradation in the form of coastal erosion, flooding, deforestation, saltwater intrusion and subsidence. Coastal erosion is widespread along most of the low-lying areas and even along some of the cliffed coastline of the region. Erosion rates of up 25 to 30 metres a year have been witnessed in some countries, principally the Victoria Beach in Lagos, Nigeria (Ibe and Quelennec, 1989).

The physical alteration and habitat modification of the GCLME coastal region through natural and man-made erosion processes is, in essence, one of the predominant problems of the region. R. E. Quelennec, 1987, has given some significant examples of coastal erosion in West and Central Africa:

> In Liberia, with a mean recession of 2m per year at Monrovia. Coastal erosion has been severe in Monrovia, in Buchanan and Greenville as a result of land-based activities. Between 1981-1997, about 100m of beaches have been lost;

In Côte d'Ivoire, with spectacular coastal recession at Port Bouet (more than 10m in 2-3 days, when the phenomenon was aggravated by the construction of the Vridi canal);
In Ghana, with an average of more than 6m/year West of Accra, since the construction of the Akosombo dam, with the present aggravation of the coastal retreat around Keta;
In Togo and Benin, and due to the construction of the large breakwaters for the Ports of Lome and Cotonou, coastal retreat has sometimes exceeded 150m in 20 years, East of Lome; retreats of more than 300 to 500m had been observed East of the port of Cotonou;
In Nigeria, particularly, around Victoria beaches, where recession of more than 500 m have been recorded since the construction of the Lagos Harbour in 1907;
In Gabon and in Angola, occurrences of rapid downslides at the northern part of Cape Lopez, littoral of Gabon and very often long sand spits (restingas) breached along the Angolan coast, have been recorded. Between Luanda and Lobito, coastal erosion has already caused considerable damage. In some localities such as Porto Amboim and Sumbe, coastline retreat has been estimated to between 2-3 metres per year, with the collapse of multiple structures, for example, in Sumbe. The same phenomenon has been noticed in Luanda where areas situated in low topographical areas near the coastline of Mussulo Island have been completely destroyed by the erosion.

The coastal erosion process, especially on the sandy or muddy littoral, constitutes one of the main factors of the degradation of the Guinean coast. Studies undertaken by the Centre de Recherches Scientifiques de Conakry/Rogbane (CERESCOR) have shown rapid recessions of the shoreline. The most affected areas are situated in Koba in the northern part of the coast, Tabounsou in the southern of the coast and in the vicinity of the Conakry peninsula area; in Koba and Tabounsou, more than 1.8 m per year of coastal retreat have been reported. As a result, there is a serious threat to tourist infrastructures on the coast as well as some residential constructions built along the shoreline (UNEP, 1999). Among the causes of this erosion,we can identify the process of sand mining on the beaches for construction purposes. A large part of the coastal erosion process increase is due to hydrodynamic and morpho-sedimentary effects as well as human activities (construction of protection dikes around Conakry harbour, dredging of channel access, coastal sand mining, anarchical occupation of the littoral by various constructions). These natural ecological or human modifications can lead, if they persist, to biological diversity losses and even to the degradation of the entire ecosystem.

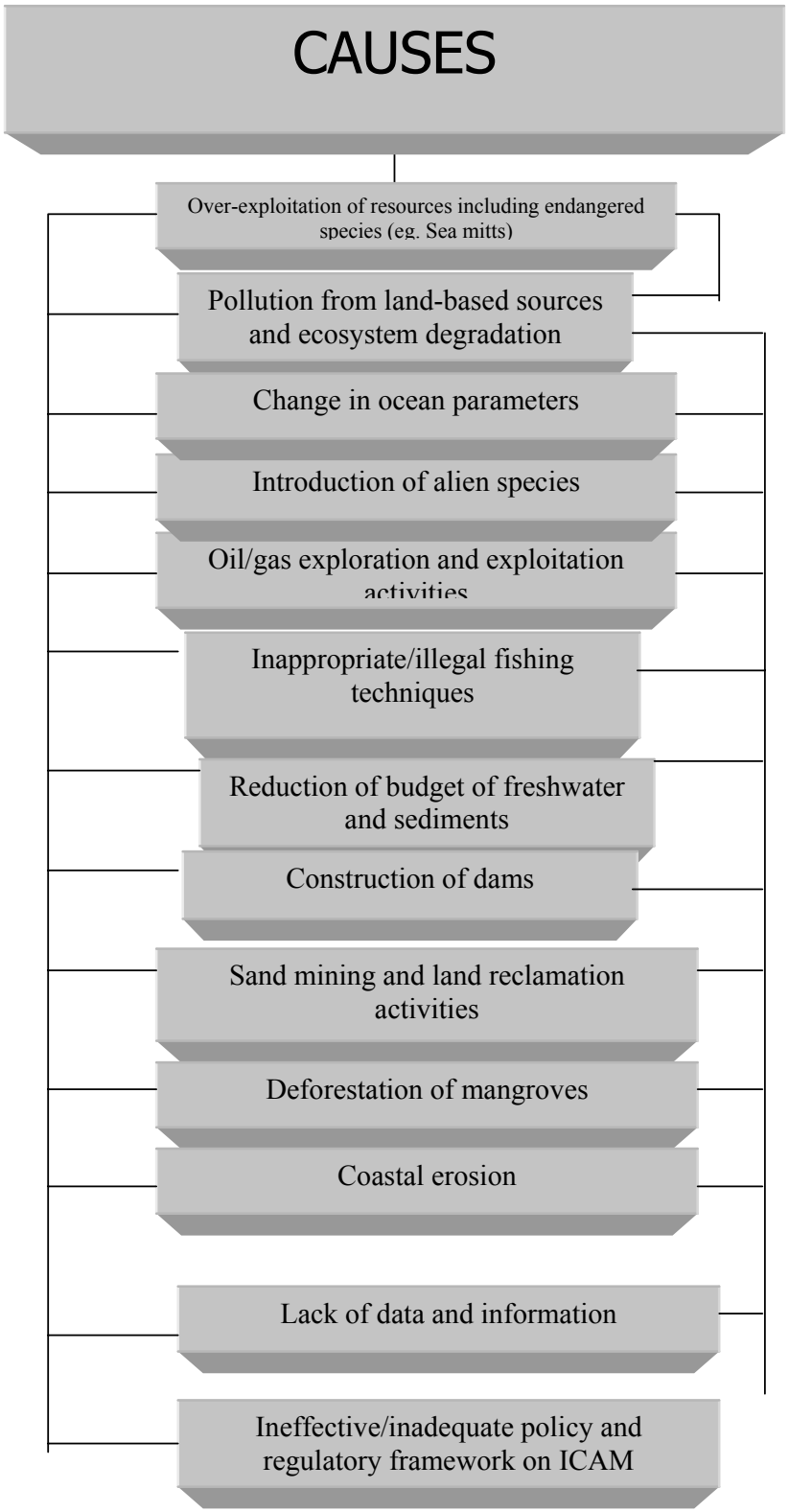
Coastal erosion in Sao Tome, particularly in the southern part of the country, has reached an alarming rate (UNEP, 1999). Some infrastructures (roads, housing, etc.) are seriously threatened. Studies to be undertaken would seek possible options in terms of costs for reducing, in the short term, the threat of coastal erosion phenomenon. Beach mining is also cause for concern. The Government has banned sand mining along the island's beaches, with only a few exceptions. Intensive beach sand mining poses an ecological threat to the equilibrium of critical habitats such as the mangroves or estuaries ecosystem.

One of the most serious problems of the Togolese coast is that of coastal erosion. Over an area of approximately 35 kilometres, between the port and the protected sector, the coast retreats by approximately 10m per year due to the sedimentary deficit caused by the port (and its dike) which blocks the sediment transit on its western side and causes the coastline to retreat in the eastern part of the port of Lome.

Furthermore, the sporadic opening of the lagoonal pass near Aneho as a result of storm waves and the lagoon flood pressure allows the penetration of marine waters which disturb the ecosystem of the Togolese brackish lake. However, the brackish lagoonal waters provoked by freshwater contribution from the Mono River leads to an ecological disequilibrium. These variations in the quality of the water contribute to the change in the habitats of various areas. The littoral of the GCLME region has been (and continues to be) subject to significant coastal erosion processes, linked to natural and man-made causes. The consequences can be sometimes tremendous, with loss of infrastructures, houses, roads, etc.

Causal chain analysis

Figure 5.5-1. Causal Chain Analysis: Loss of Biotic (Ecosystem) Integrity (Changes in Community Composition, Vulnerable Species and Biodiversity, Introduction of Alien Species, etc.)



Sectors and stakeholders

Supporting Data

Several environmental factors predispose the GCLME to fisheries stock levels and species composition. These include hydrography, especially temperature, salinity and other water quality parameters; tidal ranges; upwelling and thermocline regimes; topography, nature of bottom and trawlability; primary and secondary productivity; benthos; associated wet lands, lagoons and their estuarine products and services; terrigenous flush; climate change and variabilities; Inter Tropical Convergence Zone (ITCZ) movements, and wind forcing; as well as rainfall and drought cycles. Oil spillage and other marine pollution, marine debris in addition to nutrient enrichment and eutrophication are major among the anthropogenic factors (Ajayi, 2001).

The sudden collapse of the Ghana-Ivoiro sardinella fishery from 95,000 t (over and above 40,000 t predicted MSY) to 2,000t a year and its seeming substitution by *Balistes spp*., trigger fish recording 200,000 tonnes a year up from nothing at all have been recorded in the GCLME. Off Nigeria, tiger prawns, *Penaeus monodon* hitherto unknown have become commercial whereas *Parapeneopsis atlantica*, brown shrimp; diminished in abundance. The fisheries assessment survey cruise conducted during the pilot phase Gulf of Guinea LME project found *Chlamys sp* in quantities hitherto unrecorded. Without a doubt environmental and climatic forcing (Koranteng and McGlade 2002) causative of biomass flips or species succession have to be further researched and factored into management strategies for ecosystem (including species composition and biodiversity) preservation (Ajayi, 2001).

There has been a noticeable increase in the incidence of aquatic weed infestation in some of these countries. Aquatic weeds are a real scourge in coastal waters due to the environmental and socio-economic impacts. For a decade in In Côte d'Ivoire these weeds have invaded coastal sites, drifting with freshwater. The Ivorien government has been aware of the harmful effects of these plants since 1980. The first specie, *Pistia stratiotes*, was endemic to freshwaters. Then in 1984, a new specie, *Salvinia molesta*, originating from America, was introduced. In 1986, a third specie, *Echornia crassipes*, was introduced. Most of the large reservoirs are colonised (Ayamé I and II, Taabo and Buyo), as are the rivers and the lagoons (Ebrié and Aby). Large rafts of *E. Crassipes* and associated species are carried seaward and then run aground on the beaches.

Invasion of GCLME coastal waters by aquatic weeds has some negative impacts on the fishing activities and on the fishing zone. Most of the time, the fishing activities are slowed down and even stopped for weeks or months until the weeds disappear. It is difficult, even impossible, to use castnets or mesh nets for fishing. The setting of traps is also difficult because of the inaccessibility of most of the fishing zone. This phenomenon is common in Aby Lagoon where the boats cannot dock. Furthermore, the aquaculture systems such as the acadjas established in the lagoon cannot be exploited because the entire surface of the lagoon is covered with the weeds. It is difficult to estimate the cost of these impacts on fisheries activities.

The periodic invasion of Ebrié Lagoon by these aquatic plants slowed down the activities in the port (difficulties for ferry boats or other boats to move or to dock in the port, obstruction of the fishing port). Periodically, the same problem is observed in other coastal waters where the riverine rural population has some difficulties moving by boat from one village to another. It is also difficult to estimate the cost of these impacts on navigation.

One other notable aquatic invasive weed, the water hyacinth, has thrived to the detriment of native species, thereby upsetting the ecological balance and the biological diversity of the region. The increased loading of the coastal waters with nutrients has provided a conducive environment for the growth of the water hyacinths which has spread and covered all of the

surface water in the coastal areas from the Benin Republic in the west to the Cross river (Nigeria) and to Cameroon in the east. Since awareness began in 1985, this phenomenon has attracted the urgent attention of the governments in the region and that of the Economic Community of West Africa States (ECOWAS) with the organization of public seminars with the attendance of experts from within and outside the region. The Governments have accorded the issues of eutrophication and invasive aquatic species topmost priority in their national planning and have set up national committees for its eradication. Unfortunately, little or no progress has been recorded in these efforts to control eutrophication, harmful algal blooms and invasive aquatic species due to the non-adoption of a transboundary and multi-sectoral approach.

Coastal habitats such as shallow estuaries, bays, lagoons and wetlands that are often reclaimed or cleared for habitation, development or agricultural purposes are the most productive nursery grounds for major fish or shellfish. They are therefore critical habitats, which underpin the regenerative capacity of the fishery of the sea (Ibe, 1993). The mangrove forest in the southeastern Niger Delta, estimated to cover approximately 7000km^2 is the largest in Africa and the third largest in the world. It plays a vital role as producers of nutrients in primary and secondary productivity and in supporting biologically diverse communities of terrestrial and aquatic organisms of direct and indirect economic value and transboundary significance.

The mangrove ecosystem and associated wetlands are under pressure from overcutting (for fuel wood and construction timber) and from other anthropogenic impacts (e.g. clearing for aquaculture practise) thereby jeopardising their roles in the regeneration of living resources (which translates into a loss or reduction of fishery resources) and 'custodians' of biological diversity as well as in the restoration of the ecosystem quality (Ibe, 1993). The pressure of a subsistence population has adversely affected these mangroves but the discovery of hydrocarbon in the Niger Delta in the mid 1950s may have been the final straw. However, as a result of the development of large urban centres with significant industrialization and human incursion into the coastal fronts, the extent of these lagoon mangroves has been reduced and several species that could be expected to occur are no longer to be found (Saenger *et al.,*1997). In the last decade or so the Nypa Palm and other exotic species has become distributed throughout the Niger Delta, invading and replacing native mangrove species and their associated animal species from many mangrove habitats. Its rapid propagation rate however threatens mangroves further in the region with all known negative consequences. Field assessments carried out during the Pilot Phases Project revealed that the rapidly growing Nypa Palm is presently confined to southeastern Niger Delta. Its rapid propagation rate however threatens mangroves farther afield in the region with all the known negative consequences. It has become quite important to clear the invasive Nypa Palm species that has invaded the Niger Delta and degraded its ecosysem and simultaneously restore the original mangrove vegetation as a civic duty to preserve the integrity of this ecosystem with all the promises this actions holds for the shared International Waters and resources of the GCLME.

6.0 Analysis of Root Causes of the Identified Problems

Based on the causal chain analyses presented earlier in the TDA (e.g., within each separate section on MPPIs), the root causes leading to environmental degradation in the GCLME can be summarized.
This analysis identifies the generic root causes of the identified MPPIs in the region so that these may be addressed through the development and implementation of the regional Strategic Action Programme.

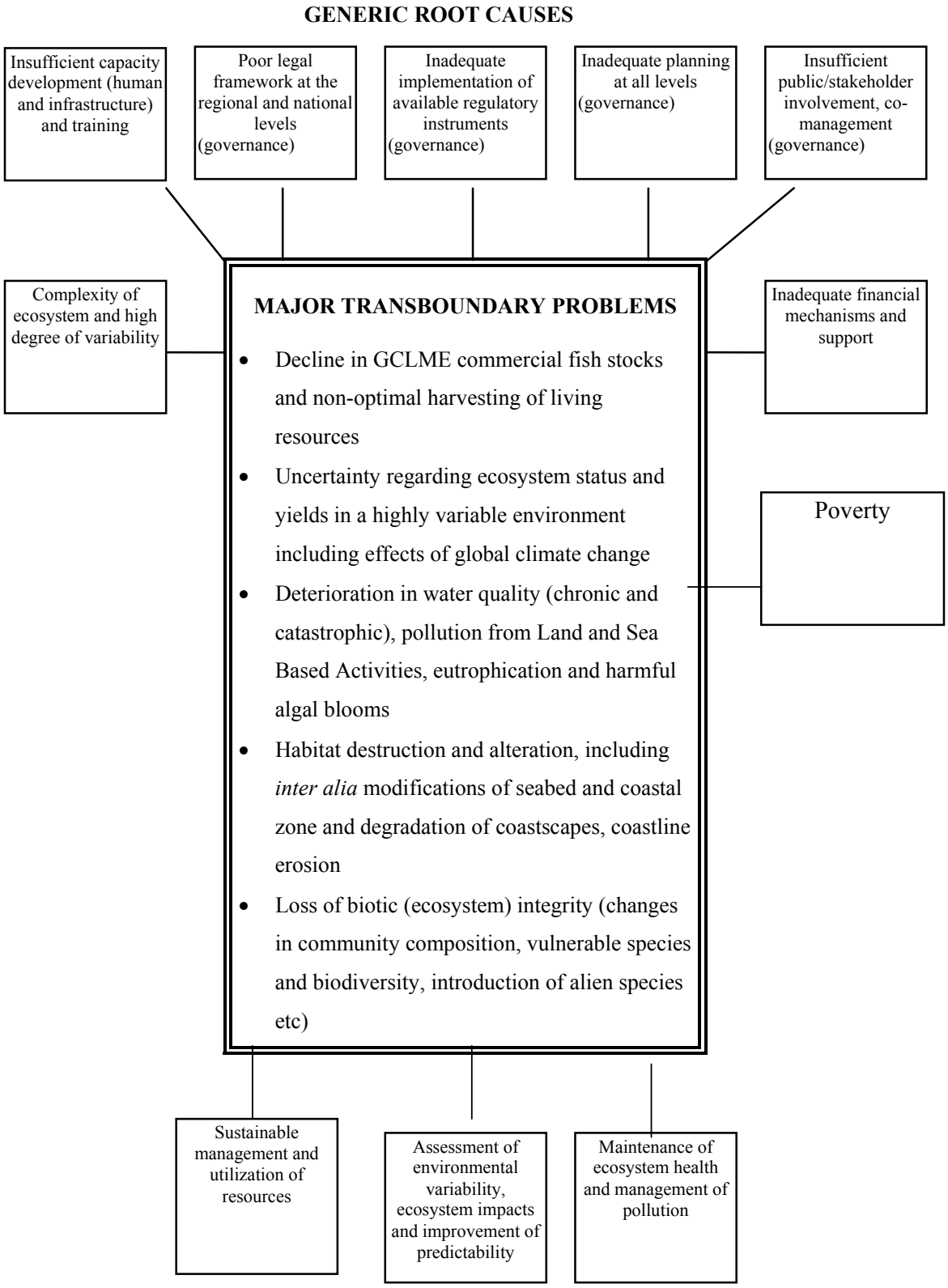


Table 6.0-1. Main Root Causes and Contributing Factors

1.	*Complexity of ecosystem and high degree of variability (resources and environment)*	• Changing state of the Guinea Current • Inadequate information and understanding • Difficulty in monitoring and assessment • Poor predictability
2.	*Inadequate capacity development (human and infrastructure) and training*	• Colonial/political past • Brain drain • Limited training opportunities • Limited number of highly trained individuals • Limited funds for infrastructure support • High prices for imported scientific equipment
3.	*Poor legal framework at the regional and national levels*	• Regionally incompatible laws and regulations • Ineffective environmental laws and regulations • Environmental Action Plans not being implemented • Environmental auditing required • Noncompliance or non-observance with laws • Lack of involvement and buy in by stakeholders • Lack of co-management
4.	*Inadequate implementation of available regulatory instruments*	• Inadequate compliance and enforcement (over fishing, pollution) • Lack of political will • Inadequate monitoring, control, and surveillance • Apparent lack of transparency in the enforcement of regulations • Indifference and poor communication
5.	*Inadequate planning at all levels*	• Inadequate intersectoral coordination • Poorly planned coastal developments • Inefficient control measures (e.g. to check coastal erosion) • Non-operational contingency plans • Limited time horizon of planners • Rapid urbanisation and informal settlements
6.	*Insufficient public involvement*	• Lack of awareness on environmental issues and public apathy • Conflicts about rights of access • Inadequate involvement of the civil society • Inadequate grassroots participation • Non-involvement of some stakeholders
7.	*Inadequate financial mechanisms and support*	• Low country GDPs • Unsustainable subsidies • Inadequate budgetary allocation for environmental problems and data collection • Ineffective economic instruments • Insufficient funding for infrastructure and management; limited economic opportunity for technical persons

8	*Poverty*	• Increasing rural-urban drift • Ineffective population control programmes • Lack of knowledge about birth control • Payment of lip-service to poverty alleviation • Unsustainable poverty alleviation programmes • Inadequate capital input towards poverty alleviation • Unsustainable technologies alternatives to traditional practice • Rapid population growth

7.0 Priority Areas of Future Interventions

7.1 Synthesis Matrix

Table 7.1-1 is a simplified version of the Synthesis Matrix developed by regional experts at GCLME workshops. This serves as a logistical "map" of the TDA through examining the transboundary elements of the problems and then relating them to their major underlying institutional, social and global root causes, which are discussed in more detail in Section 6.0 above. The matrix identifies three generic areas where proposals for action can be formulated. These action areas and their more specific "sub-issues" are discussed in detail in Section 7.2 where required actions and outputs are listed.

The numbers in the column labelled "Major Root Causes" correspond to Table 6.0-1 above.
The Action Areas are:
A: Sustainable management and utilization of resources and habitat restoration
B: Assessment of environmental variability, ecosystem impacts and improvement of predictability
C: Maintenance of ecosystem health and management of pollution

Table 7.1-1. Synthesis Matrix

Perceived Major Problem	Transboundary Elements	Major Root Causes	Action Areas
Decline in GCLME commercial fish stocks both resulting from and leading to non-optimal harvesting of living resources	Most of the regions important harvested resources are shared between countries, or move across national boundaries at times, requiring joint management effort	1,2,3,4,5,6,7, 8	A,B (C)
Uncertainty regarding ecosystem status and yields in a highly variable environment including effects of global climate change	Environmental variability/change impacts on ecosystem as a whole, and poor predictive ability limits effective management. The GCLME may also be severely impacted by global climate change (subceptibility to increased coastal erosion and flooding)	1,2,3,7	A,B,C
Deterioration in water quality (chronic and catastrophic) and Pollution from Land and Sea Based Activities, eutrophication and harmful algal blooms	While most impacts are localised, the problems are common to all the sixteen countries and require collective action to address the pollution from municipal, industrial and agricultural sources. Eutrophication and algal blooms are a common problem in most of the countries and require collective action to address	1,2,3,4,5,7	C
Habitat destruction and alteration, including *inter alia* modification of seabed and coastal zone, degradation of coastscapes and coastal erosion	Uncertainties exist about the regional cumulative impact from petroleum exploration on benthos and ecosystem effect of fishing. Degradation of coastscapes and coastal erosion reduce regional value of tourism	2,3,5,6,7,8	A,C (B)
Loss of biotic (ecosystem) integrity* *Changes in community composition, vulnerable species and biodiversity,	Fishing has altered the ecosystem as a whole, reduced the gene pool, and caused some species to become endangered or threatened. Introduced alien species are a global	1,3,5,6	A,C (B)

introduction of alien species etc.	transboundary problem		

7.2 An Overview of Specific Transboundary Problems, Causes, Impacts, Actions Required and Anticipated Outputs

In the Synthesis Matrix, three broad action areas were identified in order to address the perceived major GCLME problems and the main root causes of these problems. The action areas correspond to the three main issues in the GCLME, namely utilization of resources, environmental variability, and ecosystem health and pollution. For each action area a set of more specific actions was specified in the Synthesis Matrix. These specific actions were formulated collectively through consensus among stakeholders at the Second Regional GCLME Workshop to identify the specific problems associated with each main issue. These have been prioritised and the outputs or solutions emanating from the specific actions have been listed and costed. The essential information has been summarised in the set of analysis tables, which follow. These tabular summaries are necessarily brief - often in point form - and where additional clarification has been deemed necessary, this has been provided following each table in the form of explanatory notes.

The following tables and explanatory text examine the nature of the specific problems identified as contributors to ecosystem degradation and change in the GCLME. They examine the management uncertainties (in the case of environmental variability, the uncertainty of the variability per se) and knowledge gaps that need to be filled. They present priority practical and implementable proposals for inclusion in the GCLME SAP and the cost of the required international actions where possible. Finally, the series of tables identify the outputs (products) that should be obtained through the successful implementation of the action. Stakeholders for each problem and action area are identified.

TABLE A 1-5 Sustainable Management and Utilization of Resources

- A1 Facilitation of Optimal Harvesting of Living Resources
- A2 Assessment of Mining and Drilling Impacts and Policy Harmonization
- A3 Responsible Development of Mariculture
- A4 Protection of Vulnerable Species and Habitats
- A5 Assessment of Non-Harvested Species and their Role in the Ecosystem
- A6 Facilitation of a functional governanace/ institutional arrangements and networking

TABLE B 1-3 Assessment of Environmental Variability, Ecosystem Impacts and Improvement of Predictability

- B1 Reducing Uncertainty and Improving Predictability and Forecasting
- B2 Capacity Strengthening and Training
- B3 Management of Eutrophication and Consequences of Harmful Algal Blooms
- B4 Control of Coastal Erosion

TABLE C1-5 Maintenance of Ecosystem Health and Management of Pollution

- C1 Improvement of Water Quality
- C2 Prevention and Management of Oil Spills
- C3 Reduction of Marine Litter
- C4 Retardation/Reversal of Habitat Destruction/Alteration
- C5 Conservation of Biodiversity

TABLES A: SUSTAINABLE MANAGEMENT AND UTILIZATION OF RESOURCES

TABLE A1: Facilitation of Optimal Harvesting of Living Resources

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
A1. Non optimal harvesting of living resources: Non optimal harvesting includes over harvesting, such as overfishing, as well as wastage through dumping of bycatch and the loss in yield by catching and dumping of under-size fish. It also includes not taking advantage of resources with the potential to offer sustainable development opportunities (e.g. seaweed, some invertebrates). This often results from a lack of technology or knowledge of the opportunities available	• Fishing overcapacity • Inadequate tools • Inappropriate fishing methods (including use of explosives), undersized meshes in nets • Poaching • Non-sustainable utilization of resources • Lack of collaborative assessment and monitoring • Inadequate information • Inadequate management • Inadequate control • Lack of collaborative management of shared	• High by-catch & undersize catch • Fisheries impacting productivity cycle • Ecosystem change • Resource depletion • Human population movements (local & regional) • Large variation in landings • Variation in food supply for birds, turtles etc. • Conflict (e.g. artisanal vs. commercial vs. recreational; conflict with mining)	• Irreversible ecosystem change • Biodiversity Change • Habitat destruction • Collapse of commercially important stocks	• Variable and uncertain job market, unemployment • Loss of national revenue • Lack of food security: artisanal /industrial • Erosion of sustainable livelihoods • Missed opportunities (under-utilization & wastage) • Loss of competitive edge on global markets	• Most harvested resources are shared between countries or cross national borders. Over fishing in one country can cause depletion in neighbour country Lack of common regulations e.g. mesh size creates enforcement diffulties • Common problems • Shared solutions	• Provision of information: to facilitate regional assessments of shared resources and ecosystem impacts. • Joint surveys and assessments • Gathering and calibration of baseline information • Analysis of socioeconomic consequences for the whole ecosystem • Assessment of potential of new resources • Establish a regional forum for stock assessment, ecosystem assessment and annual advice including advice on harmonization of management actions and co-management	**1** **1** **1** **1** **2** **1**	$ 1 000 000 $ 2 000 000 $ 400 000 $ 400 000 $ 1 000 000 $ 800 000	• Optimal sustainable resource utilization • Improved forecasting •Establishment of a regional forum • Prevention of irresistable ecosystem change

available. Variability in, e.g. small pelagic productivity and availability can cause socio-economic disruption Poaching by distant fleets.	resources (including fisheries management body e.g. Compact or Commission) • Over-harvesting of turtles Lack of forecasting capability	• Declining turtle population • Competition for exploited resources							

A1 Explanatory notes. Problem: Non-Optimal harvesting of living resources

Causes

- Fishing overcapacity – Too many fishers, too many boats, excess processing capacity.
- Inadequate tools for assessment – Currently available tools for assessment do not always produce effective results, data for assessment are not equally available and are not in a uniform format. Assessment tools that are available are not applied equally within the region, and fishing methods are not sufficiently selective.
- Non-sustainable utilization of resources due to overfishing, high bycatch, catches of small fish and non-targeted species. This is a tradition in worldwide fisheries management.
- Lack of collaborative assessment and monitoring – there is no effective and sustainable mechanism within the GCLME region to ensure that collaborative assessment takes place.
- Inadequate information – the biology of all harvested and potentially harvested species is not always well known. In the latter, some groups with economic potential, such as seaweeds and some invertebrates, are very poorly known within the region.
- Inadequate management – management due to insufficient information, insufficient harmonization across transboundaries, vulnerable to pressure from industry, over-riding socioeconomic and political pressures. Lack of informed advice sometimes results in ill-advised management decisions.
- Inadequate control – even when assessments and quotas are used to manage fisheries, the control and enforcement mechanisms are often lacking particularly where transboundary issues occur
- Lack of collaborative and harmonized management of shared resources.
- Turtle harvesting – Food preferences and econmic pressure on local communities and inproper fishing nets have contributed to the decrease in marine turtle populations, with implications for other components of the ecosystem.

Impacts

- Resource depletion – This is an obvious effect of over-harvesting, a depletion of the resource below optimal levels.
- High bycatch & undersize fish catch – This reduces the productivity of fisheries, and may lead to ecosystem change (uncertainty) and decreased yields.
- Fisheries impacting productivity cycle – The depletion of, for example, a grazer such as sardine from the system could cause the diversion of production into eutrophication and shift the system out of balance. Changes in the system could reduce yields in other ways too, e.g. changes that favour large gelatinous plankton. Recruitment fisheries result in productivity and yields that are less than what they could be under better management.
- Ecosystem change – Over-harvesting of ecologically important species may change the nature of the ecosystem, such as diverting productivity into decompositional pathways
- Human population migration (local & regional) – Declines in opportunities in resource harvesting at the coast leads to increased migration into cities, and the expansion of urban poverty, exacerbated by large slumps in catches. (GCLME Thematic Report on Socio-economics & Governance)
- Large variation in landings – results should be precautionary approach leading to reduced levels of over-harvesting. Regularity of employment, reliability of markets, etc. all suffer when variation is great.
- Variation of food supply for birds, turtles etc. Humans and other organisms compete for food. Over-harvesting of resources by humans may lead to a decrease in food supply available to seabirds, turtles, and other marine organisms that may themselves be important as tourism resources.
- Conflict (e.g. artisanal vs. commercial vs. recreational) – Artisanal, recreational and commercial fishers often compete for the same resources. Conflicts among these sectors may increase when resource become depleted.
- Declining turtle population.
- Competition for exploited resources – harvesting of pelagic resources can have an impact on food availability for other top predators.

Risks/uncertainty

- Irreversible ecosystem change – The degree to which changes that take place in the ecosystem (as a result of over-harvesting) are reversible, is not known.
- Biodiversity change – Changes in biodiversity (genetic, species, ecosystem) may occur as a result of the over-harvesting of resources, but the lack of good baseline data makes this difficult to assess. Hence we do not know the degree to which overfishing affects biodiversity.
- Habitat destruction – The degree to which over-harvesting affects habitat through impacts on dominant species, or directly through impacts of the harvesting technology (e.g. bottom trawls) is unknown.
- Actions in one country can cause collapse of a shared commercially important stock(eg. Collapse of Guinea Current fish stock as result of gross overfishing by foreign fleats)

Socioeconomic consequences

- Financial & job numbers – Over-harvesting of resources reduces the number of jobs and the financial gain accruing to coastal communities. Jobs lost in one country may result in an increase in emigration to another country due to changes in employment opportunities, fishers may move across boundaries due to decrease in local resources availability causing socio-economic and resource strifes in other countries.
- Loss of national revenue – If resources are over-harvested, or if opportunities to developing new resources on a sustainable basis are missed, then the contribution of those resources to the national revenue base is reduced.
- Lack of food security (artisanal/industrial) – artisanal fishers depend on fisheries resources directly for protein (large segments of the population depend on artisanal catches for protein); over-harvesting by both the artisanal and industrial sector may erode the food security of coastal artisanal fishers and their families. Loss of jobs in the industrial sector may also increase poverty, and decrease food security.
- Erosion of Sustainable livelihoods – livelihoods of coastal people may often depend on activities that are based on assets (e.g. fish resources) that are harvested by other sectors. Over-harvesting of those assets, either by coastal dwellers themselves or by industrial harvesting, may erode the livelihoods of coastal people, and bring about increased urban migration and increases in urban poverty and the spreading of poverty-related diseases.
- Missed opportunities (under-utilization & wastage) – There may be many opportunities for the novel utilization of marine resources. Examples include drugs from both inshore and deep-water invertebrates. A coordinated regional assessment of such resources and coordinated development could bring regional benefits in this area.
- Competitive edge on global markets – Lost markets are difficult to regain e.g. shrimps and lobsters of high value. Increases or reductions in yields in one area may impact upon another area (country), resulting in market competition among the GCLME countries. To retain a competitive edge in rapidly changing markets, stability of the throughput and quality enhancement that comes with that stability are essential.

Transboundary consequences

- Most of the regions important harvested resources are shared between countries(i.e. stradle national boundaries), or move across national boundaries at times. (See GLCME Thematic Report on Fisheries and Regional Synthesis Report). Over-harvesting of a species in one country can therefore lead to depletion of that species in another, and in changes to the ecosystem as a whole.
- Inappropriate management of regional resources endangers sustainability of resources and consistency of catches, and leads to sub-optimal use. Lower food production, loss of jobs & national revenue, and increase reliance on foreign aid. GCLME countries are currently major importers of fish products.
- Potential irreversible changes in nature of ecosystem due to depletion of widely distributed ecologically important species.
- Movement of vessels and humans across borders in response to depletion of resources. Increased local and regional conflicts.

- Depletion and/or large-scale distributional shifts in predator species in response to reduced prey abundance.

Activities/solutions

- Co-management with fishing communities and industry –Co-financing from the fishing industry and other donors is a priority for effective management.
- Provision of information to facilitate regional assessments of shared resources. A structure should be established to conduct regional stock assessments, ecosystem assessments, evaluate resource-environmental linkages, and facilitate post-harvest technology. Joint stock assessments with the BCLME and Canary Current LME should be explored and implemented.
- Joint surveys & assessments – Carried out cooperatively will help produce enhanced management and optimal utilization. These joint surveys will be offered as a 5-year demonstration of the benefits to the individual nations of joint transboundary assessments.
- Gathering and calibration of baseline information - This should be done on resources, potential resources before harvest, as well as ecosystems.
- Cooperative analysis of socioeconomic consequences - Analyses of the socioeconomic consequences of non-optimal and improved use of resources should be done with a view to appropriate intervention within the framework of improving sustainable livelihoods.
- Cooperative training - Cooperative training will be essential to generate regional capacity needed to address the transboundary issues, and to promote sustainable intergrated management. Cooperative training targeted at communities will so be necessary. Training – in management, enforcement, and the creation of new opportunities.
- Cooperative assessment of potential new transboundary resources. Potential new resources in both offshore and inshore areas in the GCLME, and should have assessments conducted cooperatively.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activites that address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Optimal resource utilization – This is the most obvious output from the suggested solutions; there will be a reduction in the exploitation level of resources that are deemed to be over-harvested so that stocks can be rebuilt to optimum levels, and an increase in the benefit to coastal communities from the improved utilisation of resources.
- Appropriate legal regimes for fisheries compliance and enforcement
- Improved forecasting – Joint assessment will enable improve predictions of sustainable resource-harvest levels.
- Establish regional structure – This regional structure will be responsible for producing annual stock assessment reports, annual ecosystem reports, and provide advice or suggestions of resource harvesting levels, and other matters related to resource use, particularly fisheries.
- Training packages on management, enforcement, and opportunity creation – all at the regional level to advance the concept of susatinable intergrated management of the GLCME.
- Improved governance, including use of co-management and appropriate stakeholder involvement

TABLE A2: Assessment of Mining and Drilling Impacts and Policy Harmonization

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
A2. Mining and drilling impacts: Exploration for oil and gas is expanding throughout the Guinea Current with new offshore oil fields being developed in Nigeria, Cameroon, Sao Tome & Principe, Equatorial Guinea, Gabon and Angola. This involves drilling, dredging and seismic exploration. There is substantial oil exploration going on in the above countries while the development of oil/gas fields (with pipelines) are planned for the ECOWAS countries-the West African Gas Pipeline Project). Capped wellheads hamper fishing while drill cuttings and hydrocarbon spills impact on the environment. Extensive Ecosystem effects of these activities are not fully known. The extent of coastal pollution deriving from Gold	• Pipelines • Drilling & dredging • Seismic exploration	• Habitat destruction • Seabed modification • Coastal soil, beach, intertidal and subtidal profile destruction • Conflicts (with fishers and fishing communities) • Behaviour of resources • Mortality of larvae	• Cumulative impacts • Effects on benthos • Change of bio-diversity • Cost/ benefit	• Financial & employment benefits • Eexclusion of areas from fishng creates negative immediate impacts but may have longterm benefits as reserves • Reduced artisanalindustrial fisheries • Coastal tourism impacted • Onshore development	• Most of the countries share common problems related to crude oil drill cuttings and wastes • Cumulative impacts are unknown but may be substantial including disruption of benthic habitat • Shared solutions • Spills cross boundaries	• Policy harmonization • Enhanced consultation sectoral and regional • Cumulative impact assessment for GCLME	1 2 1	$ 100 000 $ 100 000] $ 500 000 [$ 500 000] industry	• Environmental management plan • Integrated management • Solution to capacity problem • Strengthened common regional Policy and Regulation

miningis not well documented but could be significant in Ghana and Cote d' Ivoire transboundary area.				effects on coastal communities, from-mining					

A2 Explanatory Notes. Problem: Mining and Drilling Impacts

Causes

- Pipelines
- Drilling & dredging
- Seismic exploration

Impacts

- Habitat destruction – Habitat destruction from onshore crude oil drilling may be localized, but offshore crudeoil exploration and exploitation disrupts large areas of seabed, disturbs the sediments and changes the particle size distribution. The impact of this on benthos and other resources, particularly fisheries resources, needs to be assessed and mitigated if necessary.
- Seabed modification – Seabed modification, related to habitat destruction, may impact on the exploitation of other resources; for example, pipelines and wellheads and their potential impact on availability of bottom areas to trawl fishing.
- Coastal soil, beach, intertidal and subtidal profile destruction. Coastal mining moves the coastal soils, alters the beach profile and destroys coastal vegetation, and intertidal and subtidal habitats important as nursery areas, increased beach erosion.
- Conflicts (fish, oil & gas). Conflicts may arise between different sectors. Appropriate strategies are needed to decrease the potential for conflict, and to resolve conflicts that arise (e.g. fishing / oil).
- Behaviour (e.g. scaring of mammals and fish during seismic surveys) & mortality (e.g. mortality of larvae) of resources – Fish migrating away from, and fish larvae being killed by activities.

Risks/uncertainty

- Cumulative impacts – The cumulative impacts of lots of smaller impacts from crude oil and gas drilling, as well as the cumulative effects over time, are unknown, but may be significant within the context of the ecosystem.
- Effects on benthos – The effects of mining on benthic communities are uncertain.
- Change of biodiversity – It is not known whether mining impacts lead to a reduction in biodiversity in the mined areas
- Cost/benefit – Costs and benefits to the environment from mining and drilling in this perspective are unknown.

Socioeconomic consequences

- Negative: Exclusion zones around crude oil and mining operations, offshore wellhead Positive: Reserves – A negative effect of crude oil drillingis the closure of large areas of coastline, restricting access to living resources by coastal dwellers or potential dwellers. A positive effect is that exclusion zones could act as biotic reserves.
- Reduced artisanal fisheries - This is a negative effect of the exclusion, as well as the impact of mining-related coastal activities.
- Coastal tourism – The closure of large areas of coast reduces the potential for tourism development in affected areas.
- Onshore development – Onshore development increases opportunities for jobs, but also modifies habitats through construction and pollution. Coastal migration, urbanization and poverty may be an impact where towns are adjacent to oil drilling areas; disparities in economic opportunities can cause conflicts.

Transboundary consequences

- Crude Oil and Gas exploration activities occur in some of the countries (GCLME Thematic Reports). Most of the impacts are localized but uncertainty exists regarding cumulative impacts of oil/gas and Gold mining that added to impacts of fishing and pollution could be significant. As such as assessment of the cumulative impacts of mining/drilling is a prerequisite for sustainable intergrated management of the GCLME.

- The oil & gas industries in the region undertake EIA's for all projects and are working together to consolidate baseline information. This results in an apreciable potential for increasing of co-financing.
- Most of the countries share common problems relating to oil & gas operations. For example, conflicts between resource users and extraction industries opportunities.
- Regulation of oil & gas exploration and exploitation and mining activities needs to be standardized and harmonized within the region.

Activities/solutions

- Policy harmonization - Cooperative harmonization of oil & gas policies, particularly related to shared resources and cumulative impacts and their mitigation, will be needed.
- Cumulative impact assessment for GCLME (industry co-funding) - An overall impact assessment of the oil & gas industry is needed.
- Enhanced consultation (sectoral & regional) is needed to reduce impacts of oil & gas and ensure benefits accrue and conflicts are reduced.
- Cooperative training will be needed for the effective management of impacts, as well as maintaining living marine resources that continue beyond mining.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities that address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Environmental management plan – An overall environmental management plan for the whole GCLME will be produced, including management plans for mitigating oil & gas drilling and other impacts.
- Integrated management – will be the output of the above plan.
- Solution to capacity problem – This will be the result of training to improve assessment and management capacity with respect to the transboundary issues.
- Regional training packages on managing crude oil, gas impacts, community development following oil well and mine closure
- Reduced socio-economic conflicts

TABLE A3. Responsible Development of Mariculture

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
A3. Mariculture is under-developed but this is rapidly changing: Mariculture has the potential throughout the Guinea Current region to provide labour-intensive employment, protein and foreign currency from export of high value products. The responsible development of a mariculture industry is hampered by lack of information and capacity and lack of harmonised/regional policy. Ecosystem effects of mariculture developments are uncertain; for example introduction of exotic species and transboundary	• Inadequate policy • Differential regional policy - policies differ in the three countries • Space • Lack of information	• Threat to biodiversity • Diseases • Conflict over space/markets • Eutrophication	• Environmental variability • Market uncertainty • Feasibility	• Employment & sustainable livelihoods • Revenue • Potential growth industry	• Biological invasion to adjacent country by alien species • Threat to biodiversity • Common problems, shared solutions • Introduction of disease organisms to impacting wild resources	• Undertake socioeconomic and feasibility assessment as basis for and harmonisation of national policy and develop regional policy to mitigate against potential problems and promote responsible development of moriculture in GCLME	1	$ 300 000	• Report on socioeconomic assessment • Feasibility report • Harmonised policy and regional policy • Training package

consequences thereof.									

A3 Explanatory Notes. Problem: Mariculture Requires Responsible Development

Causes

- Introduction of exotics – Mariculture may use exotic species, which can create threats to biodiversity & ecosystem function. Both directly through escapees and indirecty through disease organisms.
- Inadequate policy – While some countries have policies in place, others do not. Policy may not be enacted even where it exists.
- Differential regional policy – Policies differ among the GCLME countries. It will be necessary to harmonize policies to minimize transboundary effects of mariculture.
- Space – The coastline of the region experiences mostly a high-energy wave climate. This means that sheltered water space needed for mariculture is limited, and other sectors also make use of sheltered water, including ports, fisheries and tourism. This results in conflict with other sectors.
- Lack of information. One of the reasons mariculture is poorly developed in the region is lack of information and lack of capacity. This is particularly true when it comes to the use of mariculture to develop and broaden the livelihoods of coastal communities.

Impacts

- Threat to biodiversity – The introduction of exotic species for mariculture purposes may threaten indigenous biodiversity by displacing indigenous species.
- Diseases – Introduction of species for mariculture may spread disease, and cause other unwanted side effects.
- Conflict over space/markets – Conflicts among sectors for limited sheltered water space are common. Transboundary conflicts over markets may occur, and countries without clear policies may be denied certain markets.
- Eutrophication is a consequence of uncontrolled development of feed-based mariculture systems. Such development must occur only within the confines of strictly enforced guidelines.

Risks/uncertainty

- Environmental variability – This creates uncertainty about the suitability of the limited sheltered water space for mariculture.
- Market uncertainty – Means that the development of mariculture carries high risk for potential entrepreneurs
- Feasibility – The feasibility of mariculture is not known for many potential species.
- Threat to biodiversity, introduction and spread of diseases.

Socioeconomic consequences

- Employment & sustainable livelihoods – Mariculture has the potential to allow the broadening of the livelihoods of coastal communities if developed with a sustainable community development policy. However, harvesters often have difficulty adjusting to mariculture employment.
- Revenue – Revenue may accrue not only to entrepreneurs but also to local communities and to the national revenue base. However, the latter will be small due to the limited water space available.
- Potential growth industry – Mariculture is one of the few industries based on living resources that has growth potential. There is very limited capacity for the expansion of harvesting from the wild. Clear sight must be kept of the limited space availability though.

Transboundary consequences

- Mariculture is underdeveloped in all countries and is being activity promoted throughout the region in view of its economic and employment potential. Co-operative transboundary activities that promote the responsible development of mariculture will minimise negative enviromental consequences and also help reduce pressure on traditionally (over) harvested resources.
- Differences in policy among countries in the GCLME could lead to conflicts (e.g. as a result spread of disease from one country to another, alien species invasion of the ecosystem from a country point

source, market conflicts etc), and differential development of the mariculture industry. Harmonization of policy will reduce the potential harmful effects of differential development.

- The introduction of exotic species into the region for mariculture, by any one country, has the potential to lead to transboundary biological invasions of the target organism or other species accidentally introduced with it. Such invasions have the potential to be a threat to the biodiversity of the GCLME as a whole.

Activities/solutions

- Socioeconomic assessment of potential – A full socioeconomic assessment needs to be conducted into the ability of mariculture to contribute to regional economy and the improvement in the living conditions of coastal communities.
- Feasibility assessment – The feasibility of mariculture for particular species in certain areas of the region needs to be assessed, and the best species for development need to be chosen on the basis of this assessment.
- Formulate harmonized policy for the region – Crucial if the negative effects of one country's policy on the economic potential of another are to be precluded.
- Training – Training will be needed, particularly in terms of promoting community-based mariculture, as well as the overall management of mariculture in the region.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities which address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Report on socioeconomic assessment – will include advice for action, particularly targeted at communities
- Feasibility report - will include advice on recommended species and areas for regional initiatives
- Policy statement - should look at overall and community potential
- Training package aimed at managers, communities and potential entrepreneurs.

TABLE A4. Protection of Vulnerable Species and Habitats

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
A4. Threats to vulnerable species: Human impact on the ecosystem by way of fishing, increasing pressure on the coastal zone, pollution etc. can impact negatively on components of the system, in particular top predators such as coastal birds *Vulnerability of habitats: Several habitats, in particular coastal habitats including nursery habitats have been perturbed or lost as a consequence of development and other human impacts, e.g. loss of wetlands, destruction of mangroves, lagoons, etc. These have transboundary consequences and may be significant globally.*	• Salt production • Population migration to coast • Pollution • Reduction of prey through fishing • Historical harvesting • Competition for space & prey (birds, humans) • Over-utilization of mangroves for food etc • Shore development exarcebates coastal erosion	• Threat to global biodiversity of coastal birds/ sea turtles • Ecosystem change • Loss of wetlands • Population reduction • Competition for exploited resources • Loss of shoreline	• Lack of assessment of ecological impacts Lack of low cost effective shoreline erosion control Lack of awareness of impacts by local communities	• Tourism Loss of jobs from loss of resource production through reduction of nursery areas Migration to urgban areas Loss of areas to launch fishing canoes	• Most vulnerable species occur throughout the region, many migrate between countries. National activitiies have transboundary consequences. • Common Problems, shared solutions.	•Assessment of status of vulnerable species and habitats - both those which are shared between countries and those which play a key role in whole ecosystem. •Improved implementation of ICAM to control habitat destruction •Habitat restoration programmes (e.g. Mangrove restoration)	1	$ 2,000 000	• Ecosystem status assessment and report • Losses mitigated

A4 Explanatory Notes. Problem: Threats to Vulnerable Species and Vulnerability of Habitats

Causes

- Salt production – Changes to wetlands and lagoons
- Population migration to coast – especially mangroves. This is a worldwide trend. Logical consequence is a threat to habitats and resources that are attractive to tourists.
- Pollution – Impacts on threatened populations and resources.
- Reduction of prey through fishing – Humans catch fish that are the food of marine mammals and seabirds, reducing food available for them.
- Historical harvesting of marine mammals
- Competition for space & prey (birds, humans) –competion among the marine organisms for food and breeding space. They are also in competition for food and space with human populations
- Canals to facilitate oil driling can lead to large scale loss of habitat through erosion
- Disruption of natural shoreline movement and sea level rise can exarcebate beach erosion

Impacts

- Threat to global biodiversity of coastal birds and marine mammals.
- Ecosystem change.
- Loss of wetlands.
- Fish resource reduction – This has happened in several lagoons.
- Competition for exploited resources – Harvesting of pelagic resources has had a huge impact on food availability for other top predators.
- Loss due to shoreline erosion.

Risks/uncertainty

- Lack of assessments and lack of preventive/ corrective measures can exarcebate impacts.

Transboundary consequences

- Most vulnerable species, including several endemics, occur throughout the region and in some cases internationally. Some vulnerable habitats occur regionally (e.g. wetlands and lagoons and mangroves), and many are of importance to migratory species. Therefore the consequences of any actions, whether national, regional or international, will have direct transboundary consequences and may be of significance globally.
- National policies to enable protection of vulnerable species and habitats need standardization/ harmonization throughout the region.

Socioeconomic consequences

- **Tourism –Vulnerable habitats (e.g. wetlands)/ beaches contribute extensively to tourism.**
- Migration due to loss of canoe launching areas, loss of fuel, loss of resource productivity can cause conflicts with other fishing communities or in urban areas.

Activities/solutions

- Assessment of status of vulnerable species and habitats –Work has started in some countries, but a holistic regional study is needed.
- Appropriate mitigation solutions need development and implementation for combatting beach erosion and reducing unnecessary loss and restoring lagoon productivity

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those transboundary activities whihc address transboundary problems requiring incremental funding are listed

Anticipated outputs

- Ecosystem report – A report on the status of the ecosystem, and the impacts of human activities on the relationships among non-consumptive resources, together with management advice. Application of solutions will mitigate habitat losses

TABLE A5. Assessment of Non-Harvested Species and Their Role in the Ecosystem

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*COST (5y*	*ANTICIPATED OUTPUTS*
A5. Role of non-harvested species in the ecosystem is unknown. Assessments of non-harvested species are not conducted. Some of these species probably have high biomass and may have potential for harvesting (and with it job and wealth creation), yet the consequences of harvesting on the food webs and presently harvested species are uncertain. There is a general lack of knowledge on the subject needed for ecosystem management.	• Lack of information	• All impacts are unknown	• Unable to predict impacts of changes in abundance of unharvested species upon harvested species • Predator/prey relationships • Large unknown biomass • Market potential • Economic viability • Unknown impact of harvest • Ecosystem impact of	• Food security potential • Jobs • Revenue	• Many non-targeted species have transboundary distributions. Some have potential for harvesting, but role in ecosystem is uncertain. Action by one country could disturb ecosystem in absense of info. • Common problem, Shared	• Dedicated joint surveys and assessments of non-harvested transboundary species to provide baseline for integrated ecosystem management.	1	$ 1 000 000	• Information on non-harvested species, assessment of ecosystem role. • Ecosystem model for management.

			pollution / habitat destruction		solutions				

A5 Explanatory Notes. Problem: Unknown Role of Non-Harvested Species in the Ecosystem

Transboundary consequences

- Many unused or underused taxa in the GCLME have transboundary distributions, and therefore any exploitation or shared knowledge gained in one country would have an effect in all countries. Such ecosystem effects ought to be addressed in a dedicated manner by gaining basic knowledge of what is in the system, its biology, and what role it plays, and how it can be impacted by anthropogenic activity.

Activities/solutions

- Joint dedicated surveys & assessment – Such surveys need to be dedicated to the non-harvested species because of the special technology needed.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities which address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Information on non-harvested species and assessment of their role in the ecosystem.
- Ecosystem model as a tool for sustainable integrated management of the GCLME

TABLES B: ASSESSMENT OF ENVIRONMENTAL VARIABILITY, ECOSYSTEM IMPACTS AND IMPROVEMENT OF PREDICTABILITY.

TABLE B1. Reducing Uncertainty and Improving Predictability and Forecasting

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
B1. The GCLME is a complex and highly variable system for which there is evidence of system change and fragmentary but important evidence of increasing instability/variability. Scales of variability include: A.. large scale sustained events; B: decadal changes; and C: high frequency short-lived events and/or episodic events. Human impacts on the GCLME (e.g. by fishing) is superimposed on the inherent natural variability, and the combined effect of anthropogenic disturbance and this variability have been implicated in ecosystem change and the collapse of harvested resources. There is also considerable uncertainty regarding ecosystem status and yields. Lack of information about	• Complexity of processes • Poor understanding of processes and cause and effect relationships • Poor understanding of global driving forces (linkages) • Lack of data/ information • Inadequate mathematical models • Lack of capacity	• **Change to coastal ecosystems from altered wind field/rainfall** • Changes in coastline morphology • Damage to coastal infrastructure • Unpredictable variations in zooplankton and fish egg/larval survival • Unpredictable changes in fish growth, mortality and recruitment •	• Long-term net change or natural cycles? • Time periods sufficient long to detect changes?	• Uncertain employment (job losses and gains) • Variation in revenue • Over- and under-utilization of resources. • Lack of food security • Human population migration • High production costs •National/regional conflicts • Reduced capacity to support artisanal	**Climate change** • **Evaluate impacts of climate change on the GCLME** **Ecosystem** • Shifts in distribution of biota • Loss of species/ biodiversity • Altered food webs • Disruption of faunal migrations **Fisheries** • Unsustainable management	• Develop regional early warning system for env. change • Targeted feasibility assessment of PIRATA /GOOS-Africa linkup/application to GCLME • Targeted transboundary assessment of potential hypoxia/ impacts • Conduct plankton	1 1 1 1 1	$ 1 600 000 $ 400 000 $ 250 000 [$ 1 000 000] $ 100 000	Regional early warning systems for major env. events/change. Quantification of utility/ application of PIRATA for Guinea Current region Information needed to design monitoring/ predictive systems Record of decadal ecosystem changes Regional environmental analysis/reporting system/ network Knowledge and expertise on global climate links Predictions and models Regional advisory groups Availability of important/ useful data Regional env. variability network. Links with Benguela and Canary Current LMEs

and understanding of environmental variability and system-wide impacts hampers sustainable management of GCLME resources and results in the non-optimal utilization of these resources. Coastal erosion is also contributing to the degradation of coastlines, and increased siltation/sedimentation of habitats.		Unpredictable changes in species' abundance, composition, distribution and availability • Regime shifts • Cross boundary movements of fish, seabirds and seal • Difficulties in managing resources sustainably • Operational difficulties with resource utilization • Assessment of anthropogenic impacts difficult		fisheries • Changes in government revenue, private income and exports.	of shared and straddling stocks • Altered fish spawning patterns and population shifts • Unpredictable fluctuations and availability of fish stocks • Unpredictable and variable distribution of fishery benefits • Regional economic instability and unemployment • Regional conflicts with other users **Coastal infrastructure** • Costly maintenance of coastal infrastructure	trawl surveys and Analyze plankton data archives for measurement of decadal change • Develop transboundary state of the environment analysis/reporting system. • Develop links with CLIVAR • Adapt/develop predictive models • Establish regional advisory groups • Data	1 2 2 2 1 1	$ 250 000 [$ 50 000] $ 300 000 $ 50 000 $ 100 000 $ 400 000 $ 50 000	

						gathering community projects • Transboundary env variability networking(incl. internet) • Establish links with the Benguela and Canary Current LMEs • Improved governance			

B1 Explanatory Notes. Problem: Highly Variable System, Uncertainty Regarding Ecosystems Status and Yields

Causes

The Guinea Current upwelling area is a highly variable with open and variable boundaries. It is unique in that it is bounded at both ends by cold water systems respectvely viz. Canary and Benguela Current. It is sensitive to environmental events (variability and change) in the Atlantic. Unlike some other Current systems (e.g. Humboldt Current in South America) there are few long-term data series to form a baseline against which changes can be predicted or assessed. There is an uneven spread of data between disciplines and between the participating countries. Difficulties in predicting changes in the system is a consequence of:

- Complexity of physical, chemical and biological interactions and processes, and the difficulties in predicting environmental variability
- Our limited understanding of cause and effect relationships, compounded by the problems of predicting not only the environmental variability but also ecosystem impacts
- Our limited understanding of driving forces (global linkages). There is also fragmentary evidence linking variability in the Pacific El Niño/La Niña (ENSO) to upwelling regimes in the GCLME. Thus, although there are pointers to the importance of remote physical (global climate) forcing of the Guinea Current, the linkages and mechanisms are not understood.
- Lack of data/information: Long-term data series are few and, the ecological processes are poorly understood.

Inadequate mathematical models applicable to the region: Very little mathematical modeling of the Guinea Current has been done internationally, and there is a general lack, in the region, of the capacity (skills and technology) to adapt available models from elsewhere, to run these or to develop new models. This applies to physical, chemical and biological (ecosystem) modeling. This is a serious drawback to developing predictive capacity .The (number of qualified personnel, equipment, vessels are limited. Moreover, emigration has resulted in further shrinkage of the skill pool. Thus is particularly true when the press of n

Impacts

Processes that give rise to variability in the Guinea Current occur on three temporal and spatial scales (A: large scale sustained events; B: decadal changes; and C: high frequency short-lived events and/or episodic events). There is evidence that environmental change/variability does impact on the GCLME in a number of ways. However, in order that these changes can be predicted sufficiently well to be useful for ecosystem management, the cause and effect must be properly quantified. The impact of environmental variability/change includes *inter alia* the following:

- Change to coastal ecosystems from altered wind field (strength and direction) and/or rainfall (quantity and distribution)(AB). Changes in wind frequency direction and strength impact on the supply of nutrients (for productivity), currents and stratification. In addition there is evidence that SST is related to rainfall in the region).
- Changes in coastline morphology as a result of climatic regime changes and short term events (storms) exacerbated by coastal zone management decisions, e.g. porrly placed jettys, hotels on beaches etc, (BC)
- Short term events (storms) leading to damage to coastal infrastructure (C)
- Variations in zooplankton and fish egg/larval survival and higher level impacts (A, B and C) through changes in primary production and stratification/turbulence caused by changes in wind frequency, direction and strength.
- Changes in species' abundance, composition, distribution and availability (A, B and C) i.e. ecosystem response to environmental change.
- Changes in fish growth, mortality and recruitment (A, B and C) - these have major implications for resource management.

Cross boundary movements of fish, seabirds turtles and marine mammals (A, B and C). The majorities of harvested species of fish either straddle country EEZ boundaries or otherwise move across these

boundaries from time to time. These movements/shifts are associated with the life histories of the species and also changes in the environment. The implications if this for sustainable management are obvious, regime shifts i.e. increased variability or a net change towards altered state (B). For example switching between species such as the dominance of Balistes in the 1970s and 80s. There is evidence linkuibg this to temperature and salinity shifts. These regime shifts can occur naturally – however the impact of fishing can exacerbate the problem.

Risks/uncertainty

Limited understanding of this highly variable system means that it is uncertain whether the observed variability reflects sustained long-term net change or natural cycles, and whether the available data series are sufficiently long to enable us to determine this.

Socioeconomic consequences

The quality of advice given to resource managers is reduced by the ability to predict, with confidence, short-, medium- and long-term changes in the Guinea Current system. A consequence of this is that responsible resource management must err on what is percieved to be (but which may not be) the conservative side. This leads to:

- Uncertain employment (job losses and gains)
- Variations in revenue
- Sub-optimal utilization of resources (particularly by artisanal fisheries)
- Lack of food security
- Human population movements in response to variable resource availability
- High production costs e.g. in fish processing
- National/regional conflicts
- Changes in government revenue, private income and exports

Transboundary consequences

Sustained major environmental events, decadal change and major short-term perturbations (e.g. 10- or 50-year storm events) do not respect country EEZ boundaries, but rather impact on the GCLME as a whole. In other words the types of environmental variability/change that are the focus of the GCLME programme are system-wide and in essence transboundary. . Many of the transboundary consequences listed below would occur regardless of the high variability of the system. Nevertheless our ability to manage them effectively is limited by our predictive capability. Some of the consequences of increased variability or sustained change include:

Ecosystem

- Shifts in distribution of biota –for example Balistes
- Loss of species/biodiversity - Alien species have also displaced indigenous species such as Nypa palm relacing mangroves in parts of the Niger Delta.
- Altered food webs
- Disruption of fish, bird, turtle and mammal migrations -

Fisheries

- Unsustainable management of shared and straddling stocks
- Altered fish spawning patterns and population shifts
- Unpredictable fluctuations and availability of fish stocks e.g. reduction in the sardine stock in the 1970s
- Unpredictable and variable distribution of fishery benefits
- Regional economic instability and unemployment
- Regional conflicts over declining resources/stocks

Coastal infrastructure

- Costly maintenance of coastal infrastructure as a result of degradation by coastal erosion

Climate Change

- Changes in the status and/or functioning of the GCLME may affect its contribution to global climate change through its role as a source/sink of CO_2 and source of methane.

Activities/Solutions

Without good baseline information and wider regional coordination and articulation, major problems and issues facing the three countries bordering the GCLME cannot be resolved. It is necessary to undertake targeted assessments of priority environment variability issues/problems and to develop appropriate systems, linkages and networking.

Development of a suitable needs-driven, cost-effective regional environmental early warning system for the GCLME by cross linking existing national system

- Feasibilty assessment of the use of information fromo the PIRATA moored buoy array in the tropical Atlantic to enhance understanding of links between weather, climate and fish. (PIRATA is an Atlantic equivalent but smaller version of an ocean buoy network in the Pacific, which is used to forecast EL Niños and La Niñas. The value of linking the GCLME with the PIRATA system would be in the forecasting of upwelling regimes and environmental variability and anomalous events originating in the tropical Atlantic.). If the feasibility assessment were to prove successful (and it looks like it will), then there is also an excellent chance of ongoing involvement between the region and PIRATA being funded from country sources and donors.
- Determination of role of upwelling systems as a CO_2 source/sink and methane source. The value of this to the international community has previously been commented on. Moreover it will provide an obvious link between the International Waters and Climate Change components of GEF. A modest demonstration project would be appropriate.
- Development of community projects for cost effective environmental information gathering and environmental education. Public awareness and involvement are seen as essential components for the successful implementation of the GCLME Programme – both for cost effective information gathering/monitoring and also to help reduce anthropogenic environmental impacts on the ecosystem.
- Analysis of plankton archives and other (oceanographic) data collections – baseline information for measurement of decadal change.
- Develop state of the environment analysis/reporting system for use on a regional basis in the GCLME
- Develop links with CLIVAR and CLIVAR Africa (CLIVAR = Climate Variability and Predictability Project of the World Climate Research Programme) and with GOOS and GOOS-Africa (GOOS = Global Ocean Observing System of the Intergovernmental Oceanographic Commission of UNESCO)
- Adapt/develop predictive mathematical models applicable to the region – the utility of this has been referred to elsewhere.
- Establishment of regional advisory groups and networking centres. This is a low cost activity with potential large benefits.
- Develop transboundary environmental variability networking for region – this links in with the proposed early warning system(see above). It will make extensive use of the internet..
- Establish links with the Canary and Beguela Current LMEs – Clearly the GCLME does not function in isolation from the rest of the south Atlantic, so building bridges/networking with other LME projects could provide valuable spin-offs in both directions.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities which address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Proven/validated regional environmental early warning system appropriate for the GCLME in a form which could be used to leverage future country and donor co-financing for permanent implementation.
- Assessment of utility/application of a PIRATA-type buoy array for the GCLME
- Documented assessment of information needed to design monitoring/predictive systems
- Assessment of decadal ecosystem changes in the GCLME since the 1950s based on historical/archival data and collections
- An established regional environmental analysis/reporting system/network and activity centre

Assessment using the best available knowledge and expertise links between the GCLME and the global climate

- Useful predictions and models
- Identification of cost-effective early-warning indicators of environmental changes that impact on fish stocks in the GCLME
- Establishment of regional enviroment network and reporting system - making full use of remotely sensed products and the internet, in a form that it can be self-sustaining operationally.

TABLE B2. Capacity Strengthening and Training

PROBLEMS	*CAUSES*	*I*	*RISKS/ UNCERTAINTIES*	*SOCIO ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/ SOLUTIONS*	*PRIORITY*	*IN M C (5*
B2. There is a shortage in capacity, expertise and ability to monitor environmental variability, to assess the linkages and ecosystem impacts of this variability and to develop a predictive capability required for sustainable integrative GCLME management. There is also an unequal distribution of availability capacity (human and	• Limited inter country exchange (training) Degrading and downsizing of research institutionsLimited training programs • Lack of running funds • Lack of skills to maintain equipment. • Lack of equipment and supplies • Lack of sufficient person power • Lack of economic opportunitys • Lack of concern from the policy makers on the ecosystem	Difficulties in to participaione in regional decision making processes • Regional imbalances in: baseline information, predictive capacity, data collection ability etc. • Inadequate information for finding indicators of future change • Lack of sufficient support forinteraction between institutions	• Commitment to supporting capacity development by governments of the GCLME region • Political and economic uncertainty	• Sub-optimal or over utilization of renewable resources due in part to lack of information, knowledge and understanding required for resource management • Unequal opportunities for resource access/ management • Absence of full stakeholder participation • Creation of conflict • Poorly informed/ advised governments at all levels • Low institutional sustainability	• Uncoordinated resource management, research and monitoring programmes • Management of overall system by individual countries is not harmonized. Capacity gaps leads to uneven research monitoring effort in the system as a whole with consequences for resource management • Difficulties with resource co-operation • Inability to monitor or manage the system as a	• Assess capacity needs to address transboundary issues. • Devise strategy * for developing job opportunities, salaries and infrastructure • Develop partnerships with private sector • Creation of regional multidisciplinary working groups • Devise, develop and implement appropriate training courses maximizing use of regional a • Interchange of personnel between countries to gain/ transfer expertise and knowledge • Improve networking via internet • Improve public information/environmental education • Increase stackholder	1 N/A to GEF 1 1	$ $2

(human and infrastructure) between participatory countries.	issues. • Brain drain	• Information which is not comparable / cannot be integrated across the region			whole	involvment and co-management	1 2	$

B2 Explanatory Notes. Problem: Lack of Capacity, Expertise and Ability to Monitor Environmental Variability

Causes

All the countries bordering the GCLME are developing countries with requirement to meet the basic living needs of their peoples. These countries are attempting to develop their economies and social structures. Funding for marine monitoring and assessment activities are very limited and policy makers are not always fully aware of the importance of transboundary environmental variability/change in ocean management applications. Viewed collectively, the lack of capacity can be ascribed to the following:

- Lower priority placed on environmental issues by policy makers
- Limited inter country exchange of personnel for liaison, experience sharing and training
- Degrading and downsizing of research institutions
- Limited training/skill development programmes
- Limited funds to meet day-to-day running expenses let alone to invest in hardware and capital items.
- Limited skills to maintain equipment.
- Limited availability of equipment and supplies –
- Severely limited numbers of trained personnel and an unequal distribution of skills between countries.
- Inadequate remuneration for regional researchers
- Brain drain; loss of personnel to the private sector and overseas

Impacts

The consequences of insufficient funding of research in the GCLME include:

- Regional imbalances in baseline information, predictive capacity, data collection ability etc.
- Limited ability to participate in regional decision-making processes, as too few people are available to do the tasks at hand.
- Inadequate information for identifying indicators of future change
- Limited interaction between institutions.
- Collection of information which is not comparable/cannot be integrated across the region

Risks/uncertainty

- Although the governments of the region are committed to capacity (skill/expertise development), this commitment is according to perceived national priorities. There is uncertainty with regard to the priority status of marine science, technology and management at the regional level.
- Political and economic uncertainty results in potential "recruits" choosing more lucrative careers – particularly those that favour mobility (emigration).

Socioeconomic consequences

The underestimation by policy makers of the importance of developing and maintaining sufficient research capacity to manage the resources of the GCLME has resulted in numerous socioeconomic problems including:

- Sub-optimal or over utilization of renewable resources
- Sub-optimal opportunities for resource access/management
- Absence of comprehensive stakeholder participation
- Creation of conflicts
- Poorly informed/advised governments at all levels
- Low institutional sustainability

All of the above are in turn direct consequences of inadequate/inappropriate communication.

Transboundary consequences

- Non cost-effective resource management, research and monitoring activities (fragmented, poorly planned and unlikely to achieve the objectives of ensuring sustainable management).

- Management of overall system by all 16 countries is not harmonized. Capacity gps leads to uneven research monitoring effort in the system as a whole with consequences for resource management e.g. possible bias in information and advice leading to inappropriate decision making.
- Difficulties with co-operation in respect of sustainable resource utilization. A holistic approach is needed to correct the damage done in the past from fragmentation..
- Inability to monitor or manage the ecosystem as a whole – The transboundary nature of the issues and problems in the GCLME necessitates a holistic approach

Activities/solutions

- The first action must be a comprehensive assessment of the real needs for human capacity and infrastructural development/maintenance relevant to the identified transbouondary issues in which clear priorities are listed. This must be executed in co-operation with all stakeholders to ensure a proper balance and minimum vested interest bias.
- Poor economic opportunities and career prospects are limiting factors. If not addressed, recruitment and training initiatives will provide little or no long-term benefits. - .
- Develop partnerships with private sector. This will promote private sector "buy-in" and provide a point of departure for long-term co-financing with industry and business.
- Devise, develop and implement appropriate training courses appropriate for the needs of the region, maximizing the use of regional resources working groups. This will be a cost-effective suitable for implementation in developing countries.)
- Creation of regional multidiscipinary working grou0s as a mechanism for consultation, cooperation and skill development.
- Interchange of personnel between countries to gain/ transfer expertise and knowledge.
- Improve networking via Internet. It is envisioned that increased use of electronic commnication is the key to the success of the GCLME programme at all levels. It will be particularly beneficial for training and system monitoring.
- Improve public information/environmental education There is a relative lack of public awareness about the GCLME, human impacts on the ecosystem, problems to be addressed to ensure its sustainable utilization and conservation of biodiversity, opportunities for job creation and wealth generation etc. All stakeholders need to be involved in co-management systems.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Except for activity asterisked, only those activities that address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Capacity development strategy for the region relevant to addressing transboundary concerns as per the Strategic Action Programme.
- Increase economic and career opportunities within the region.
- New institutional networks taking advantage of the internet and world wide web
- Improved regional management of resources
- Increased multilevel public awareness of the issues and problems and the need for sustainable integrated management of the GCLME. Increased stakeholder involvement and co-management
- Improved infrastructure and improved availability of persons with the necessary skills.

TABLE B3. Management of Eutrophication and Consequences of Harmful Algal Blooms

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/ UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES / SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*OUTPUTS*
Eutrophication caused by increased nutrient loadings from municipal (sewage) and agricultural sources is increasing in the region. Algal blooms are a conspicuous feature of upwelling systems. Harmful algal blooms haave been increasingly noted throughout the world. The frequency of occurrence, spatial extent and duration of harmful algal blooms needs to be documented for the GCLME. The effect of harmful	• Natural processes • Introduction of cysts in surface waters • Nutrient loading of coastal waters from anthropogenic activities • Changing state of the Guinea ecosystem • Introduction of exotic species	• Poisoning and mortality of human consumers of marine organisms • Mortality (mass) of marine organisms • Disruption of mariculture activities • Interference with recreational use of the sea • Anoxia which in turn may cause mortalities of marine organisms	• Increase or decrease in incidence and intensity of HABs • Role of HABs in the system as a whole • Contribution of anthropogenic nutrient loading to incidence of HABs	• Human mortality • Loss of tourism revenue • Increased cost of shellfish production (monitoring, testing, depuration) • Loss of fish/ shellfish/ mariculture markets and jobs	• Occurrence of harmful algal blooms in the GCLME • Migrations of species across national boundaries (See Notes)	• Develop and implement Best Environmental Practices/Best Available Techniques for agriculture for reduction of nutrient loadings • Develop an Eutrophication and HAB assessment and reporting system for GCLME region as a whole	2 1 2 2	$50,000 $350 000 $100 000 $50 000	• BEP/BAT for agriculture • HAB regional network • Regional contingency plan • Public education materials • Proactive management

algal blooms is manifested in two main ways: production of toxins which cause mortalities of shellfish, fish and human; and anoxia in inshore waters which also can lead to massive mortalities of marine organisms.						• Regional HAB contingency plans • Community projects linked to ministries of agriculture and health • Mitigation of impacts of HABs • Improve national capacity to monitor eutrophication and toxins/species	2 2	[$50 000] (National)	

B2 Explanatory Notes. Problem: Eutrophication and Harmful Algal Blooms (Habs)

Causes

- Natural processes – Algal blooms occur naturally in the GCLME. Some may be harmful. Human impact can cause HABs to spread, and introduce exotic HAB species into the GCLME.
- Introduction of cysts into surface waters – Human activities such as drilling, dredging and certain types of fishing disturb the sediments and can release cysts of HAB species into the water column, thereby triggering new blooms, and expanding the area impacted by HABs.

Nutrient loading of coastal waters from anthropogenic activities – Increased nutrient loading of coastal waters from e.g. sewage discharges, agriculture and industries increase the probability of occurrence of HAB outbreaks.f HABs may occur as the result of changes in the state of the Guinea Current ecosystem. (System-wide monitoring for HABs would be required to discern any definite trend.) There is little or no control over the discharge of ballast water from ships entering national waters in the three countries, and there is a suspicion that these discharges may spread of HABs in the GCLME.

Impacts

HABs affect a wide spectrum of activities in the marine environment. The impacts include:

- Poisoning and mortality of human consumers of marine organisms can occur from HABs.
- Mortality (mass) of marine organisms. The species at highest risk are the filter feeders (e.g. oysters) and organisms that consume these filter feeders. Mortality can be caused directly by toxins and clogging of gills, and indirectly by depletion of oxygen in the water column.
- Disruption of mariculture activities – Mariculture is dependent on good water quality. HABs result in disruption or closure of mariculture facilities necessitating expensive water treatment, isolation of facilities, etc. Depending on the nature of the mariculture venture and the HAB, the closure/disruption can be short-lived or permanent.
- Interference with recreational use of the sea – Apart from being toxic and unsightly, some HABs cause respiratory problems in swimmers and those living in close proximity to the sea.
- Anoxia which in turn may cause e mortalities of marine organisms

Uncertainties

- Unknown incidence of HABs as a consequence of insufficient monitoring.
- Role of algal blooms in the system as a whole
- Contribution of anthropogenic nutrient loading to incidence of HABs

Socioeconomic consequences of potential HABs occurrences

- Human mortality. Deaths have occurred and numerous people have suffered respiratory difficulties and gastro-intestinal problems as a consequence.
- Loss of tourism revenue (see impacts)
- Increased cost of shellfish production (monitoring, testing, depuration)
- Loss of fish/shellfish/mariculture markets and jobs. Mariculture is a potentially valuable growth industry in the GCLME. It is constrained by a general lack of information and knowledge, including lack of information about the potential of the HAB problem in the GCLME.

Transboundary consequences

- Incidence and effects of HABs are commo n threats to all countries
- HAB outbreaks can be extensive and straddle national boundaries. In addition advective processes together with shipping operations, and bottom trawling, and dredging can redistribute cysts across national boundaries.

Activities/solutions

- Develop and implement Best Environment Practices/Best Available Techniques for agriculture to reduce discharge of nutrients

- Develop an HAB reporting system for GCLME region as a whole. This is seen as a high priority within the GCLME. It is also essential for the development of a sustainable mariculture industry.
- Community awareness projects linked to national ministries of health to alert the public to dangers associated withpotential HABs as needed.
- Develop national/regional HAB contingency plans which include early warning systems and guidelines for medical practitioners to deal with HAB associated problems
- Improve national capacity to analyze for toxins and identify harmful species by sharing expertise between countries
- Mitigation of impacts of HABs on mariculture operations (e.g. relocation of mussels rafts, treat blooms with "herbicides")

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Except for activities asterisked, only those activities which address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- BEP/BAT for agriculural practices
- Established HAB regional reporting network, with transboundary early warning system(to alert neighbouring state when required)
- Regional contingency plan for dealing with effects of HABs implemented in all countries as needed,
- Public education materials prepared and distributed regionally s needed
- Substantial contribution to the sustainable and responsible development of mariculture within the GCLME.
- Proactive integrated management in general.

TABLES C: MAINTENANCE OF ECOSYSTEM HEALTH AND MANAGEMENT OF POLLUTION

TABLE C1-3 Improvement of Water Quality; Reduction of Land-Based Sources of Pollution; Prevention and Management of Oil Spills; Reduction of Marine Litter

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
C1. Deterioration in coastal water quality: Coastal developments and rapid expansion of coastal cities, much of which was unforeseen or unplanned, has created pollution "hotspots". Aging water treatment infrastructure and inadequate policy/monitoring/ enforcement aggravates the problem.	• Unplanned coastal development • Chronic oil pollution • Industrial pollution • Sewage pollution • Air pollution • Mariculture • Lack of policy on waste & oil recycling • Growth in coastal informal settlements	• Public health • Reduced yields • Unsafe edible organisms • Changes in species dominance • Ecosystem health, productivity and resilience • Loss of jobs at regional level	• Few or no baseline data • Performance standards and thresholds • National commitment to capacity-building • Cause-effect relationships	• Loss of tourism • Higher health costs • Altered yields • Reduced resource quality • Aesthetic impacts • Lowered quality of life • Loss of employment	• Transboundary pollutant transport • Migration of marine organisms, e.g. seals • Negative impacts on straddling stocks • "Hotspots" common solutions	• Develop standard environmental quality indicators/ criteria • Establish regional working groups • Training in marine pollution control • Plan/adapt regional pollution monitoring framework • Establish effective enforcement	1 1 2 1 1 1	$100 000 $50 000 $100 000 $50 000 (National) $1 500 000 $2 000 000	• Shared solutions for water quality management • Regional protocols and agreements • Improved pollution control • Socioeconomic uplift

						agencies * • Demo projects on pollution control and prevention • Demo projects on ICAM • Joint surveillance	1		
C2. Major oil spills: A substantial volume of oil is mined and transported through the GCLME region (from oil terminals in producing countries) and within it, and there is a significant risk of contamination of large areas of fragile coastal environments from major	• Sea worthiness of vessels/ equipment • Military conflict • Sabotage • Human error	• Coastline degradation • Mortality of coastal fauna and flora	• Recovery period • Cost recovery mechanisms • Return to peace in Angola	• Opportunity costs (e.g. tourism, fisheries, salt production) • Altered yields • Reduced resource quality • Aesthetic impacts	• Resource sharing for containment, surveillance, rehabilitation, etc. • Ramsar site protection (border wetlands) • Transboundary pollutant transport	• Regional contingency plan development • Research/ modeling of recovery periods • Public awareness of notification procedures • Port state control	1 3 3 3	$500 000	Regional contingency plan., shared resources, rehabilitation plans, regional protocols and agreements

accidents, damage to straddling stocks and coastal infrastructure.									
C3. Marine litter: There is a serious growing problem throughout the GCLME.	• Growth of coastal settlements • Poor waste management • Little public awareness and few incentives • Illegal disposal from vessels • Poverty of coastal communities • Ghost fishing • Fishing discards	• Faunal mortality • Negative aesthetic impacts • Damage to fishing equipment	• Accumulation zones • Illegal hazardous waste disposal	• Loss of fishing income • Public health • Cleanup costs • Loss of tourism • Job creation in informal sector	• Transboundary transport	• Litter recycling (Ghana demo project) • Harmonization of packaging legislation • Public awareness • Port reception facilities • Regulatory enforcement • Standardized policies • Seafarer education	1 3 1 1 2 2 1	1 000 000 $50 000 $100 000 $50 000	• Cleaner beaches • Education material/ documents available regionally • Standardized policies and legislation on packaging/ recycling incentives

C1 Explanatory Notes. Problem: Deterioration in Water Quality

Causes

- Activities are mainly focused around urban centers, increasing urbanization and associated knock-on effects. Worst effected areas are are the coastal cities where majority of the population reside and the industries are sited
- Various sectors contributing to pollution, with varied degrees of cross sector co-operative management
- Knock-on effect of introduced mariculture species and associated water quality pollution effects in protected embayments
- Variable consistency in application of policy, both nationally and regionally
- Informal and formal settlements vary in their control of pollution discharges. Pollution is increasing due to urbanization.
- Shipping activities and hydrocarbon exploration and production are major sources of chronic oil pollution.

Impact

- Avariety of factors are responsible for deterioration of human health and ecosystem health/resiliance (GCLME Thematic Report on Pollution)
- Species invasion (poorly planned mariculture enterprises), changes in species dominance, reduced yields from ecosystem.
- Loss of jobs at regional level, reduction of regional tourism potential

Risks/uncertainty

- Limited data available from which to evaluate existing water quality, so it is difficult to establish a regional baseline.
- Validity of existing standards and thresholds within the regional context is uncertain.
- Tracing of impacts back to initial causes is difficult and causation is often unknown.
- Reduction of pollution in worst affected areas may not be practicable on short/medium term.

Socioeconomic consequences

- Input of nutrients and associated pollution may cause a short-term increase in production, combined with longer-term stock failure.
- These consequences are interrelated: pollution decreases tourism, which reduces jobs, which increases poverty, which in turn increases pollution.

Transboundary consequences

- Deterioration of water quality may cause species migration (temporary/permanent). Pollutants from industries/activities near to country borders can be transported across boundaries by prevailing currents.
- Impacts are (variably) common to each of the participating countries – a "generic" project with flexibility to meet nations' needs should be established. Establishment of common policy is necessary to minimise transboundary impacts.
- Most water quality issues are common to at least two of the countries and require common strategy and collective action to address.

Activities/solutions

- An overall regional working group should be established to effectively co-ordinate integrated solutions to:
    - Environmental quality indicators
    - Marine pollution control and surveillance
    - Regional monitoring/inspection of coastal zone
    - Regional enforcement of standards

- Prevention of "polluters" escaping controls by locating in adjacent countries.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Except where asterisked, only those activities which address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Integrated local, national, or regional system implementation with decrease in pollution and associated long-term savings in clean-up and education costs. It is anticipated that the benefits which will be demonstrated by the proposed actions will be such that leverage of national or donor funding for continued implementation following the conclusion of the GCLME will be possible in view of the benefits which will acrue from a modest investment.

C2 Explanatory Notes. Problem: Major Oil Spills

Causes

- Variability of seaworthiness of vessels operational from the region, as well as transport through the region.

Impacts

- General coastal degradation (temporary habitat loss), with varied recovery rate, depending on species vulnerability and spill intensity. (Associated monitoring of fauna/flora recovery is essential.)

Risks/Uncertainty

- Recovery period in system is sensitivity-dependent
- Regional and national peace and political stability are most conducive to programme success.
- General environmental deterioration leads to aesthetic deterioration and then tourism loss.

Socioeconomic impacts

- Revenue loss is a function of spill intensity and environmental sensitivity, and duration of spill.

Transboundary consequences

- Regional co-operation needed in use of equipment/manpower.
- Riparian/estuarine boundaries are particularly vulnerable.
- Co-operative management of spills moving across borders. (Management/clean-up of a major spill near country boundary can only be effective if comensurate actions are taken by the neighbouring state)

Activities/solutions

- Regional co-operation paramount in standards development: policy, equipment, and techniques.
- Dmonstration projects on pollution reduction and control and ICAM

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities that address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Regional policy and optimal utilization of resources.

C2 EXPLANATORY NOTES. PROBLEM: MARINE LITTER

Causes

- Rapid urbanization and unplanned settlement, with variable and limited/no control by authorities.
- Existing formal infrastructure unable to cope with expanding informal developments.
- Public apathy/indifference.
- "Lost" fishing equipment and associated "wastes."
- Non-returnable/disposabale nature of containers of packaging used in the region. (Absense of regulations and incentatives for return of containers and use of biodegradable materials)

Impacts

- Aesthetic and multiple impacts are associated with economic loss, although there may be job creation in the informal sector (waste management).
- Plastics and ropes (including fishing lines) present a significance amd growing hazard to marine mammals and seabirds (entanglement, ingestion)

Risks/uncertainty

- Volume of hazardous substances dumping unknown.
- Need to identify areas of waste accumulation through natural processes.
- Positive impacts (job creation in informal sector) are balanced by lack of incentives not to litter.
- Potential degree of transboundary movement.
- Issues common to all countries – create a "blueprint" and apply flexibly to all countries.

Activities/solutions

- Public awareness is key to successful implementation and a sustained clean environment– primary focus is seafarers
- Common policy/practice and implementation – i.e. "return" (bottles) product incentives – common policy re boundary transfer and legislation (packaging) review.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities which address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Clean coastal zone
- Educated and up lifted public
- Improved legislation and standards implemented from local/national/ regional levels ~ coordinated
- Reduction in negative impacts on marine mammals and seabirds(particularly relevant to threatened/endangered species)

TABLE C4. RETARDATION/ REVERSAL OF HABITAT DESTRUCTION/ALTERATION.

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y)*	*ANTICIPATED OUTPUTS*
C4. Habitat alteration/ destruction (see also A4). Several habitats have been altered or lost as a consequence of development and other human impacts. Impacts can be categorized into three areas, viz.: 1. Coastal – progradation/ redistribution; 2. Nearshore (< 30m) 3. Shelf/slope (200 m)	• Demersal trawling • Variable river sediment input and changing land use • Oil/gas exploration/ production and spills • Mariculture • Natural sediment transport (altered erosion) • Built coastal structures • Human settlement and resource use • Mangroves/coastal deforestation •	• Increased turbidity (sediment plumes, etc) • Benthic community destruction • Mobilization of heavy metals • Faunal impacts e.g. reproductive failure • Potential Increased frequency of HABs • Coastal erosion • Organic loading/anoxic conditions	• Near-complete lack of data • No framework for impact monitoring • Cumulative local vessel impacts • Climate change • Distinguishing impacts from natural spatial and temporal variation	• Costly infrastructure, rehabilitation & maintenance • Loss in mariculture production • Decreasing human health via heavy metal contamination • Loss of fisheries productivity/ revenue, • Opportunity costs	• Sediment transport • Common problems, e.g. erosion • Redistribution of marine fauna as a consequences of habitat alteration	• Document fully presented status • Adapt & apply regional marine and coastal early warning system and action plan • Assess causality of habitat alteration. • Adapt & apply standard environmental quality criteria • Adapt & apply regional structure to address problems • Adapt & apply expertise in coastal processes	1 1 2 1 1 1/2	$ 50 000 $150 000 $100 000 $50 000 $100 000 [$50 000]	• Comprehensive status report • Regional early warning system ad action plan • Transboundary causality established • Regional structures and agreements • Improved coastal planning (Integrated Coastal Areas Management)

C4 Explanatory Notes. Problem: Ecosystem Health Declining

Causes

- Coastal progradation ~ sand mining activities, subsequent longshore redistribution of sands – sedimentation of mangroves and other natural processes.
- Coastal destabilization due to anthropocentric activities.
- Natural sediment movement (natural rehabilitation of mined areas ~ masking actual impacts, which may possibly occur later and be more severe.
- Various fishing activities

Impacts

- Oil exploration-generated drilling and plumes ~ potential re mobilization of heavy metals (food chain impacts) from dredging and water quality deterioration.
- Mariculture can cause local organic loading and anoxic conditions.
- Habitat modifications impact on HABs.

Risks/uncertainty

- Incomplete/lack of data ~ severely limiting ~ but increasingly available due to mining companies' existing programmes.
- Should standardize framework for evaluation of impacts.
- Impacts from multiple vessels in close proximity unknown ~ carrying capacity to be determined.
- Necessary to distinguish anthropogenic impacts from natural variability.
- Altered sediment structure and particle size composition with consequence for benthos and remobilization of certian minerals(metals).

Socioeconomic consequences

- Unknown costs of rehabilitation and subsequent evaluation of rehabilitation success.
- Human health affected through knock on effect in food chains.
- Loss of revenue from renewable resources.

Transboundary consequences

- Marine fauna migrating due to habitat loss.
- Sediment remobilization.

Activities/solutions

- The present status requires proper documentation, and establishment of baseline at regional level.
- Establish/identify regional parameters for approach to early warning systems and associated quality performance standards.
- Develop mechanisms of co-operation between industries, ministries and other stakeholders, and strengthen capacity
- Needs-assessment to improve coastal management expertise.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only those activities which address transboundary problems requiring incremental funding are listed.

TABLE C5. Conservation of Biodiversity

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y*	*ANTICIPATED OUTPUTS*
C5.Loss of biotic integrity: This refers to ecosystem impacts including changes in community composition, species diversity, and introduction of alien species – a set of measures of ecosystem health.	• Introduction of alien species • Selective fishing mortality (targeted fishing) • Incident mortality bycatch/ discharges • Pollution impact • Over-harvesting • Habitat alteration (e.g. destruction of mangrove areas), beach erosion • Lack of implement	• Local extinction especially of benthic species • Introduction of pathogens • Genetic impoverishment (loss of resilience)	• Source of alien commensals? • Invasive ability? • Beneficial or harmful? • No baseline data	• Loss in community income from fishing and mariculture • Potential public health impacts • Opportunity costs, e.g. tourism • Political pressure to over-harvest • Lost income – prolonged recovery time • Uncertainty of	• Transfer of alien species via shipping/ mariculture • Natural processes • Fisher migration • Shared stocks	• Harmonize regional policies • Link with GEF ballast water project • Regional fishing policies co-management • Identification of MPAs (incl. Transboundary areas)- Benin demo proposal • Identify genetic population	1 2 1 1 2 1	$50 000 $30 000 $1 500 000 $20 000 $50 000	• Harmonized regional policy • Co-Financing • Regional protocols • Establishment of negotiated marine protected areas • Biodiversity conservation baseline • Reduction/ control of alien introductions,

	ation of international laws			sustainable livelihoods • Modification of food source of consumers		s structures • Develop forum for stakeholder participation and negotiation of biodiversity code of conduct			policy decisions, forum established

C5 Explanatory Notes. Problem: Loss of Biotic Integrity

Causes

- Introduction of alien species
- Changes in community composition, population distribution and abundance due to overfishing, selective fishing (targeted at a particular species), and incidental (bycatch) mortality.
- Other identified causes included pollution impacts, habitat alteration (including mangrove destruction), and lack of implementation of international conventions (e.g. Convention on Biological Diversity and marine treaties).
- Lack of holistic approach to ecosystem management i.e. only management of individual species/components in isolation.

Impacts

- Introduction of pathogens and other commensal species: Alien species (intentionally or inadvertently imported) may arrive with unseen viruses, ectoparasites, and other commensals.
- Genetic impoverishment refers to the loss of genetic variability as a result of population 'bottlenecks' (severe crash in population numbers) which will normally reduce population resilience and fitness (ability to cope with future environmental change).

Risks/uncertainty

- Invasive ability: the ability of introduced species to survive, reproduce and replace indigenous species.
- Beneficial or harmful? The "beneficial" assessment is perceived as a socioeconomic one (e.g. shrimps are more easily marketed in select sizes from mariculture than in wild harvest), but the "harmful" assessment is *primarily* an ecological one. (On the longer term, what may at present be perceived as beneficial may not be sustainable. This has serious implications for sustainable integrated management of the ecosystem.

Socioeconomic consequences

Alien species:

- Potential public health impacts refer primarily to pathogens imported with ballast water aliens.
- Opportunity costs: for example, alien infestations can cause a loss of diving tourism revenue.

Fishing impacts:

- Political pressure to over-harvest: In a population recovery period, low quotas often cannot be implemented due to political pressure (leading to a very much longer recovery period).
- Loss of income: Prolonged recovery periods strain the industry through loss of revenue. Uncertainty of sustainable livelihoods: Government policy incentives are needed to encourage alternative job creation to sustain fishers during low yield periods, or a temporary industry shutdown.
- Modification of food source of consumers: in much of West Africa large segments of the populations depends on fish for their main protein source particularly dried small pelagics. A shift to other marine fish would be difficult due to lack of refrigeration or the processing capabilities.
- Migration of fishers -- when over-harvesting causes depletion of fish stocks, fishers may be forced to move.

Activities and solutions

- Cognisance is taken of the existing GEF international ballast water management project, which may include some countries in the GCLME region in its suceeding phases.
- ***NB: The oil producing countries in the GCLME are very concerned about uncontrolled dumping / flushing from ships generally (including bilge waters – not just marine litter and ballast water).*
- Regional (GCLME region) policy on aquaculture / mariculture should be developed and then harmonized with those of neighbouring countries, including Canary and Benguela LME regions. (Refer to B-3)

- Regional (& national) management plan for biodiversity conservation must include a framework for assessment and prediction of environmental change impacts.
- Identification of marine protected areas: Attention can also be given to possible marine protected areas that have transboundary implications.
- Identify genetic structure of populations: an essential component of a regional biodiversity conservation management plan. It has important implications for fisheries management (do countries manage the same or different stocks of individual species?).

Activities/solutions

- Harmonisation of national policies and the development of a regional policy.
- Establish/identify regional parameters for approach to early warning systems and associated quality performance standards.
- Develop mechanisms of co-operation between industries, ministries and other stakeholders, and add capacity
- Needs-assessment to improve coastal management expertise.

Priority

- Proposed activities are ranked on a scale of 1-3 in terms of their perceived priority. Only activities that address transboundary problems requiring incremental funding are listed.

Anticipated outputs

- Regional quality indicators: Adapt and apply existing environmental quality indicators to the GCLME for specified variables.
- Harmonised regional policy and emergence of regional protocols
- The establishment of a forum for stakeholder participation in negotiating a biodiversity code of conduct is seen as an important outcome.

TABLE C6. Inadequate/Inappropriate Data and Information Management

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y*	*ANTICIPATED OUTPUTS*
C6.Inadequate/Inappropriate data and information management	• Poor data generation • Poor capacity and infrastructure for data support and networking • Extensive disaggregated data across countries • Lack of awareness of data systems • Use of wrong IT approaches	• Extensive gaps in data series • data exchange/ communication barriers • Inadequate regional integration of scientific efforts and monitoring programmes • poor data-based decision-making • poor environmental data availability, and dissemination methods.	• Political and economic uncertainty • Political will •	• Poor data-based planning • Poorly informed stakeholders at all levels	• Difficult inter country data standardisation and calibration • Lack of inter country data comparability • Poor ata and information disseminat ion across the countries	• Establish a regional cooperation for data standards, dissemination and a GIS • Set up a network between centres of excellence, for training, exchange and support • Collaborate with appropriate international Agencies in the use of IT to develop the regional potential in the			

	• lack of critical equipment for comprehensive monitoring, data analysis, processing and storage of information					management of data and information; • Set up and develop a Guinea Current Large Marine Ecosystem regional data base and website ; • Provide equipment support to the national data and information management centres			

TABLE C7. Governance and Institutional Framework.

PROBLEMS	*CAUSES*	*IMPACT*	*RISKS/UNCERTAINTIES*	*SOCIO-ECONOMIC CONSEQUENCES*	*TRANS-BOUNDARY CONSEQUENCES*	*ACTIVITIES/SOLUTIONS*	*PRIORITY*	*INCRE-MENTAL COST (5y*	*ANTICIPATED OUTPUTS*
C7.Inadequate/Inappropriate Governance Regime	• Decision Making Process most times atop-bottom Approach • Poor interlinkages across sovereign, political and language boundaries • Lack of coordination of environmental Arrangement • Poor environmental awareness and rights • Inadequate region wide institutional framework • Inadequate region wide legal and regulatory framework	• Alienation of stakeholders in environmental arrangement • Non-coordination and standardisation of environmental arrangement • Inability to enforce region wide environmental arrangement laws/practice	• Political and economic uncertainty • Political will •	• Absence of full stakeholders' participation • Poorly informed government at all levels		• ICAM • Facilitate functional region wide governance / institutional framework and linkages • Centres of Excellence designation • Environmental awareness • Facilitation of effective enforcement • Development of regional • Development of regional environmental laws / regulations • Regional court (environmental)			

What is not immediately apparent from the above tables is that there are a number of generic actions that cut across the specific actions within each of the three broad action areas, and indeed even between the broad action areas. For the sake of completeness the essence of this alternative but complementary approach is as follows:

Action Area A: Sustainable management and utilization of resources

Generic Actions:

- Capacity strengthening and training
- Joint surveys and assessments of shared resources and intercalibration.
- Policy harmonization and integrated management
- Co-financing with private sector/industry
- Development of alternative means of livelihoods or new industries (e.g. mariculture, tourism)
- Facilitation of a functional governance / institutional arrangements and networking
- Develop existing data and information network and management system through capacity building, improved infrastructure and institutional management.
- Strengthening of governance

Action Area B: Assessment of environmental variability, ecosystem impacts and improvement of predictability

Generic Actions:

- Capacity strengthening and training for management of transboundary concerns
- Regional networking and international linking
- Development of regional early warning system, assessment and prediction capability (including re-assessments) and joint response policies
- Cross-cutting demonstration projects
- Facilitation of functional institutional arrangements
- Promote cooperation and improvement of transboudary connections based on the data and information management expertise available in the existing centres of excellence
- Strengthening of governance

Action Area C: Improvement of ecosystem health and management of pollution

Generic Actions:

- Capacity strengthening and training
- Policy harmonization, and development
- Development of regional framework for assessment
- Establishment of effective surveillance and enforcement agencies
- Development of stakeholder participation structures
- Facilitation of a functional governance / institutional arrangements and networking
- Strenghtening of governance

What emerges quite clearly from the above approach is that generic actions, such as capacity strengthening and training, the development of regional collaboration or networking in respect of surveys and assessments, and policy development and harmonization, are over-arching actions. These are obvious priorities for GEF support.

Table 7.0-1. Proposed Areas for Action to Address Environmental Problems in the GCLME Region

A.	*Sustainable management and utilization of resources and habitat restoration*	• Facilitation of optimal harvesting of living resources • Protection of critical habitats and vulnerable species of biodiversity • Restoration of degraded critical habitats • Responsible development of mariculture • Assessment of non-harvested species and role
B.	*Assessment of environmental variability, ecosystem impacts and improvement of predictability*	• Reducing uncertainty and improving predictability and environmental forecasting • Capacity strengthening and training • Management of eutrophication and consequence of potential harmful algal blooms • Control of coastline erosion
C.	*Maintenance of ecosystem health and management of pollution*	• Improvement of water quality • Assessment and management of land-based sources and disposal pollution • Monitoring the levels and effects of pollutants for compliance enforcement • Identification of hotspots and critical areas and examination of mitigating / alleviation factors • Harmonisation of regulations and regional cooperation • Prevention and management of oil spills • Reduction of marine litter • Retardation/reversal of habitat destruction/alteration • Conservation of biodiversity • Improve integrated coastal area management in urban, rural and industrial areas • Strengthening Public Private Partnerships • Strengthen National & Regional capacity for assessment and evaluation

8.0 Ecological Quality Objectives

The synthesized Regional report and the draft preliminary Transboundary Diagnostic Analysis identified the major perceived problems of the GCLME as decline in GCLME fish stocks; uncertainty in ecosystem status, integrity, and yields; deterioration in water quality; and habitat destruction and alteration.

For a number of these issues and problems, quantitative indicators of loss or degradation are not available. In some cases, the data and information are not uniform throughout the region. Further in-depth studies or retrieval of data and information may be required in order to establish definitive Ecological Quality Objectives (EQOs) for protection and management of natural resources and the environment. However, preliminary EQOs and targets have been established/proposed for the key issues identified for priority action in the immediate future.

Environmental Quality Objectives, Targets and Priority Actions:

As an approach to categorize and prioritize interventions for each major perceived problem and issue, the MPPIs were recast into overall Environmental Quality Objectives.

The environmental impacts, socio-economic impacts, and root causes of the various MPPIs overlap to a great extent as might be expected as is indicated in the Synthesis Matrix. Recognizing these overlaps and the priorities derived from the TDA process, the EQOs were limited to three overarching objectives:

1) Achieve Sustainable Fisheries

Targets

- Fisheries structure restored to natural condition of the 1950s by 2020
- Recovery of two important commercial/artisanal fish species by 2015

Priority Actions

- Complete effective regional stock assessment 2008
- Put in place quota system by 2008
- Implement effective monitoring and enforcement by 2010
- Enhance food security by using alternative sources such as aquaculture/mariculture
- Develop and agree on species management plans for three important threatened species
- Conserve/protect critical habitats

2) High Quality Water to Sustain Balanced Ecosystem

Targets

- Reduce inputs of priority pollutants to the sea by 10% by 2015
- Improve water quality in 32 priority coastal areas by 2010

Priority Actions

- Develop effective regional monitoring, database and reporting capacity for water quality
- Agree on regional environmental quality standards
- Implement legal/regulatory changes to support water quality objectives
- Provide investments in sewage treatement and industrial process controls to reduce inputs of heavy metals, POPs, excessive nutrients and other priority pollutants

3) Balanced Habitats for Sustainable Ecology and Environment

Targets

- Halt net loss of mangroves by 2015

- Reduce eutrophied coastal waters by 50% by 2015
- Restore beach sediment supply to slow coastal erosion at ten sites by 2010

Priority Actions

- Inventory, monitor and replant mangroves
- Implement legal/regulatory reforms to protect critical habitat such as mangroves
- Develop regional agreement on sediment sharing and its restoration
- Develop research and monitoring capability for assessing eutrophication and its causes
- Develop concrete management plans with supporting legislation for priority eutrophic sites, including investment activities

Each of the three over-arching EQOs addresses more than one of the MPPIs identified in the region. As such, implementing actions to achieve these EQOs will address the GCLME's MPPIs.

1) Achieve Sustainable Fisheries

Addresses the following MPPIs:

- Decline in GCLME fish stocks and non-optional harvesting of living resources;
- Uncertainty regarding ecosystem status and yields in a highly variable environment including the effects of global climate change;
- Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc.).

2) High Quality Water to Sustain Balanced Ecosystem

Addresses the following MPPIs:

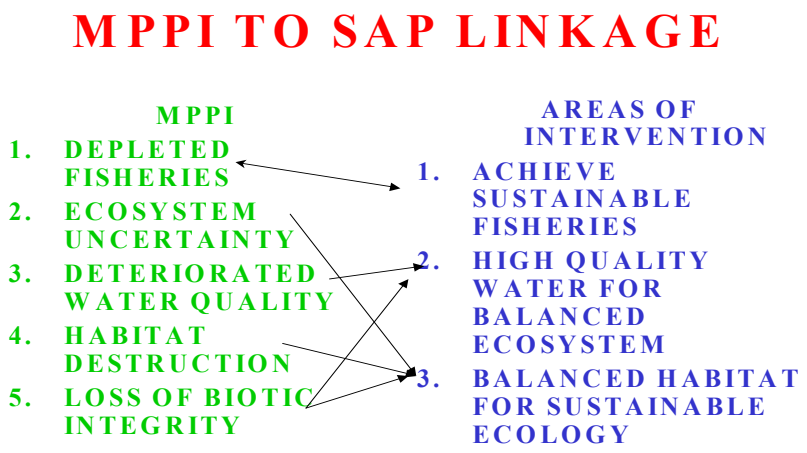
- Decline in GCLME fish stocks and non-optional harvesting of living resources;
- Deterioration in water quality (chronic and catastrophic) pollution from land and sea-based activities, eutrophication and harmful algal blooms;
- Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes and coastline erosion;
- Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc.).

3) Balanced Habitats for Sustainable Ecology and Environment

Addresses the following MPPIs:

- Decline in GCLME fish stocks and non-optional harvesting of living resources;
- Deterioration in water quality (chronic and catastrophic) pollution from land and sea-based activities, eutrophication and harmful algal blooms;
- Habitat destruction and alteration including *inter-alia* modification of seabed and coastal zone, degradation of coastscapes and coastline erosion;
- Loss of biotic (ecosystem) integrity (changes in community composition, vulnerable species and biodiversity, introduction of alien species, etc.).

Figure 8-1. Map of linkages between Major Perceived Problems and Issues with the Areas of Intervention (EQOs) identified in the SAP.



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Annex A: List of Conventions and Agreements

International Conventions and Agreements of which countries in the GCLME Region are parties to. Date of ratification given; x indicates convention signed/ratified but no date (in indicated year) given.

	GBI	GUI	SLE	LIB	CIV	GHA	TOG	BEN
La convention sur la pêche et la conservation des ressources biologiques de la haute mer		20-Mar-66						
1963 Act Regarding Navigation and Economic Cooperation between the States of the Niger Basin.		21-Nov-80						
1964 Agreement on the River Niger Commission and Navigation and Transport.		21-Nov-80						
1964 Convention on the Development of the Lake Chad Basin.								
1966 Convention internationale sur les lignes de charges								
1968 African Convention on the Conservation of Nature and Natural Resources.		12-Dec-89			16-Jun-69	X	1979	
1969 International convention on civil liability for damages due to pollution by hydrocarbons (and amendments)		29-Nov-89			15-Jun-75	X		
1969 International convention on the open sea intervention in case of accident likely to lead to a pollution by hydrocarbons Bruxelles, 1969		26-Nov-69			7-Apr-88			30-Jan-86
1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.		29-Nov-89			5-0ct-87	X		30-Jan-86
International Convention for the Conservation of Atlantic Tunas						X		
1971 Ramsar convention relative to humid areas of international importance so as to guarantee reinforced protection of stay and nestling place of some migratory species		24-Sep-92			Feb-93	X	09-Jun-95	
1971 Traite interdisant de placer des armes nucleaires et d'autres armes de destruction massive sur le fond des		Mar 1989						07-Jul-96

mers et des oceans ainsi que dans leur sous-sol								
1972 Convention on the Protection of the World Cultural and Natural Heritage.		18-Jun-79			1987	X		14-sep-86
1972 Convention sur le reglement international pour la prevention des abordages en mer								
1972 Convention on the Prevention of Marine Pollution by the Dumping of Wastes.		Apr 1991			09-oct-87	1982		1982
1973 International convention against ships pollution (MARPOL) London		May 1991			5-0ct-87		09-May-90	01-Nov-85
1973 Convention on endangered wild fauna and flora species international trade (CITES) Washington		20-Dec-81			Feb-93	X		28-May-84
1974 Convention internationale sur la sauvegarde de la vie humaine (SOLAS)		Nov 1980						X
1979 Convention on the Conservation of Migratory Species of Wild Animals.		28-May-87			1994			01-Apr-86

	GBI	GUI	SLE	LIB	CIV	GHA	TOG	BEN
1981 Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region.		23-May-81			05-Aug-84	23-03-81	1984	07-Sep-97
1981 Protocol relative to cooperation as regards fight against pollution in case of critical situation Abidjan		23-Mar-81			05-Aug-84		16-Aug-83	1994
1982 Convention on the Law of the Sea.		29-Nov-89			1994	X	19-Aug-94	30-Aug-83
1985 Vienna Convention for the Protection of the Ozone Layer.		Apr 1983			1983	1983		1983
1986 Convention concernant la securite dans l'utulisation de l'ambiente					1983	1983		1994
1987 Montreal Protocol on Substances that Deplete the Ozone Layer.		1983				1982		1983
1989 Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal.		1995			09-Jun-94			
1991 Convention d'Abuja instituant une communauté economique africaine					1993	1989		1993
1992 Amendement au protocole de Montréal		Nov 1992						
1992 Convention cadre des Nations Unies sur les changements climatiques		01-Mar-94					08-Mar-95	16-Mar-93
1992 Convention on climate change Rio de Janeiro		1994			14-Nov-94			1994
1992 Water pollution Control and Biological Diversity Conservation in the Large Marine Ecosystem of the Gulf of Guinea, Vienna								1995
1992 Convention de Dakar sur la coopération des états riverains de l'Atlantique								
1992 Convention on biological diversity Rio de Janeiro		07-May-93			14-Nov-94		04-Oct-95	30-Jun-94
1994 Convention sur la desertification		19-Apr-97						11-Jul-96

	NIG	CAM	GAB	EQG	CON	DRC	ANG	SAO
La convention sur la pêche et la conservation des ressources biologiques de la haute mer								
1963 Act Regarding Navigation and Economic Cooperation between the States of the Niger Basin.	1963	01 Feb 66						
1964 Agreement on the River Niger Commission and Navigation and Transport.	1964							
1964 Convention on the Development of the Lake Chad Basin.	1964	1966						
1966 Convention internationale sur les lignes de charges		14 Aug 84						
1968 African Convention on the Conservation of Nature and Natural Resources.	1968	29 Sep 78	15-Sep-68			13-Nov-76		
1969 International convention on civil liability for damages due to pollution by hydrocarbons (and amendments)								
1969 International convention on the open sea intervention in case of accident likely to lead to a pollution by hydrocarbons Bruxelles, 1969	1981	14 May 84	29-Nov-69					
1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.	1981	12 Aug 84						
International Convention for the Conservation of Atlantic Tunas								
1971 Ramsar convention relative to humid areas of international importance so as to guarantee reinforced protection of stay and nestling place of some migratory species					29 –Jun-96	15-Sep-94		
1971 Traite interdisant de placer des armes nucleaires et d'autres armes de destruction massive sur le fond des mers et des oceans ainsi que dans leur sous-sol								07-Jul-96
1972 Convention on the Protection of the World Cultural and Natural Heritage.	1972	07 Dec 82			-	17-Dec-75		
1972 Convention sur le reglement international pour la	1972	14 May 84						

prevention des abordages en mer								
1972 Convention on the Prevention of Marine Pollution by the Dumping of Wastes.	1975	1982				16-Oct-75		
1973 International convention against ships pollution (MARPOL) London	1973	En cours			27 Jan 1983			
1973 Convention on endangered wild fauna and flora species international trade cities Washington		05 Jun 81	3-Mar-73			18-Oct-76		
1974 Convention internationale sur la sauvegarde de la vie humaine (SOLAS)		25May 80						
1979 Convention on the Conservation of Migratory Species of Wild Animals.	1975	07 Sep 81			3 Mar 99			

	NIG	CAM	GAB	EQG	CON	DRC	ANG	SAO
1981 Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region		01 Mar 83	23-Mar-81		15 Dec 85			
1981 Protocol relative to cooperation as regards fight against pollution in case of critical situation Abidjan		01 Mar 83						
1982 Convention on the Law of the Sea.	1994	19 Nov 85	10-Dec-82			17-Feb-89		
1985 Vienna Convention for the Protection of the Ozone Layer.	1983	22 Sep 88			Mar 1994	15-Sep-94		
1986 Convention concernant la securité dans l'utulisation de l'amiante	1983	20 Feb 89						
1987 Montreal Protocol on Substances that Deplete the Ozone Layer.		01 Jan 89				15-Sep-94		
1989 Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal.						15-Sep-94		
1991 Convention d'Abuja instituant une communauté economique africaine	1988	1991						
1992 Amendement au protocole de Montréal		10 Aug 92			Mar 1994			
1992 Convention cadre des Nations Unies sur les changements climatiques					1996	8-Dec-94		
1992 Convention on climate change Rio de Janeiro		19 Oct 94						
1992 Water pollution Control and Biological Diversity Conservation in the Large Marine Ecosystem of the Gulf of Guinea, Vienna		Dec 93						
1992 Convention de Dakar sur la coopération des états riverains de l'Atlantique								
1992 Convention on biological diversity Rio de Janeiro		19 Oct 94	12-Jun-92		1996	15-Sep-94		
1994 Convention sur la desertification		Jun-95			8 Jan 99	11-Sep-97		

ANNEX B: BRIEF HISTORY OF THE GCLME PROJECT

In spite of the various sectoral national monitoring and assessment efforts, coastal area and marine data and information provide limited transboundary and integrated regional information upon which management actions and political decisions can be based at regional level negotiations. They are also invariably not designed to assess long-term trends and potential threats of cumulative impacts of human activities. Until recently most laboratories in the region did not have standardised methodologies and techniques for sampling, analysis and interpretation of data. There were relatively limited regional inter-calibration exercises to make their results inter-comparable prior to the implementation of the pilot phase Gulf of Guinea LME Project.
The countries have recognised the environmental and socio-economic challenges facing their common marine, coastal and freshwater resources and have accepted the need for joint stewardship in managing the commonly shared resources of the GC LME in order to ensure its future sustainability.

Regional Cooperative Efforts for Joint Management of the Guinea Current LME
The international community has long recognized the need to manage the marine environment, especially the maritime zones outside the jurisdiction of coastal States. In particular, Governments have been enjoined to take early action to adopt effective national measures for the control of significant sources of marine pollution, including land-based activities, living marine resources depletion and habitat degradation[4]. Governments were also mandated, through various international protocols, to coordinate such management actions regionally and globally. The Abidjan Convention for Co-operation in the Protection, Management and Development of the Marine and Coastal Environment of the West and Central African Region was born out of the need to undertake regional and common approaches to the prevention, reduction and combating of pollution in the marine environment, the coastal areas and related inland waters of western Africa.

Motivated by the outcome and declarations made at the United Nations Conference on the Environment and Development (UNCED), a couple of international researchers proposed the adoption of the large marine ecosystem (LME) concept as the ecological framework to achieve the UNCED objectives. The LME concept, which was adopted by the Global Environment Facility (GEF) and member countries, not only provides a holistic and integrated approach for the prevention of pollution in marine and coastal environments, but also provides specific recommendations for the :

- development and enhancement of the productivity and potential of living marine resources, and
- promotion of integrated management and sustainable development of coastal, marine and associated environments.

The current GEF LME Project Approach to integrated management, and sustainable development and use of the resources of/the coastal areas and marine environment is a programme that facilitates the development of a regional Strategic Action Plan (SAP) by coastal States towards long-term management through international co-operation within a subregional, inter-regional, or regional framework. This approach is designed is to support and supplement national efforts of coastal states to promote integrated management and sustainable development of coastal and marine areas under the coastal states jurisdiction including their Exclusive Economic Zones (EEZ).

[4] Stockholm Declaration on the Human Environment (1972)

The Guinea Current region was one of the first regions where the LME concept was first applied for coastal and marine environmental management. The Global Environment Facility (GEF) funded pilot phase project titled, "Water Pollution Control and Biodiversity Conservation in the Gulf of Guinea Large Marine Ecosystem" was implemented between 1995-1999. The project, an the initiative of five (later six with the participation of Togo) countries in the region [namely Benin, Cameroon, Côte d'Ivoire, Ghana, Nigeria and Togo] was implemented with the technical assistance of UNIDO, UNDP, UNEP and the US-NOAA (under the United States Department of Commerce) and the collaboration of a host of national, regional and international organizations. The GOG-LME project represented a regional effort to assess, monitor, restore and enhance the ecosystems capacity and productivity in order to sustain the socio- economic opportunities for the countries in the coming decades.

The development objective of the Gulf of Guinea LME (GOG-LME) project was "the restoration and sustenance of the health of the Guinea Current LME and its natural resources, particularly as it concerns the conservation of its biological diversity and the control of water pollution".

The following specific strategic objectives were established for the project:

- Strengthening regional institutional capacities to prevent and remedy pollution of the Gulf of Guinea LME and associated degradation of critical habitats;
- Developing an integrated information management and decision making system for ecosystem management;
- Establishing a comprehensive programme for monitoring and assessing the living marine resources, health, and productivity of the Gulf of Guinea LME;
- Preventing and controlling land-based sources of industrial and urban pollution;
- Developing national and regional strategies and policies for the long-term management and protection of the Gulf of Guinea LME.

An approach adopted in project implementation was to build onto already existing national infrastructures a regionally co-ordinated and integrated programme of monitoring and assessment and developing among others:

- a system for joint fishery surveys for assessing changes in the spawning stock biomass (ssb) of the important species
- a structured regional monitoring programme to determine the quality of the coastal areas and the health of the GOG Marine Ecosystem
- a system of coastal and marine ecosystem measurements, information synthesis, and reporting for mitigation of coastal stress
- indices of environmental quality assessment of the coastal and marine ecosystem.

The initiation of the GOG LME and the implementation of the capacity building component for monitoring and assessment of the coastal areas and marine environment significantly contributed to the following positive developments including:

- Laboratories across the region presently using standard validated methods for data generation and also periodic inter-calibration to ensure inter-comparability of results
- Productivity monitoring with continuous plankton recorder (CPR) on weekly tows have been in progress since November 1995 using ships of opportunity. The results of the monitoring will constitute the basis of estimating marine living resources.

- Mangrove surveys and studies that have resulted in the publication of draft mangrove distribution and disturbance maps. The maps will form the basis of proposals for mangrove restoration schemes
- Application of Standard methods for coastal wetlands pollution using WHO Rapid Assessment Guidelines. This has been used in assessing the pollution state of selected lagoons.
- Fisheries stock monitoring in collaboration with ORSTOM has been undertaken in a living resource survey in the Western Gulf for assessment of fish stocks and their species diversity.
- Installation of a GIS system for data-base development at the national and regional level, and established protocols for effective exchange of data and information between participating countries, as well as exposing them to other global institutes. Facilitated scheme of co-operation and mutual assistance such as pooling available equipment and facilities in addition to sharing experience and exchanging data and information.

A regional GOG LME environmental monitoring and assessment has thus been born under the GEF project.

Achievements under the pilot phase Gulf of Guinea LME

The outstanding accomplishments of the Pilot-Phase GEF Gulf of Guinea Large Marine Ecosystem (GOG LME) Project (1995 - 1999), as verified in Tri-Partite Review Reports and the Final In-Depth Evaluation, is ample proof of the catalytic and defining roles that GEF incremental funding can play. Some of the results achieved during the pilot phase include:

- adoption of Ministerial level ACCRA DECLARATION(1998) aimed at institutionalising a new ecosystem-wide paradigm consistent with GEF operational guidelines for joint actions in environmental and living resource assessment and management in the Gulf of Guinea and beyond;
- substantial progress in building regional and national water quality, productivity and fisheries assessment and management capabilities based on standardised methodologies;
- planning and implementation of 2 co-operative surveys (first in the western gulf in July/ August, 1996 and secondly in the entire Gulf, Feb/March, 1999) of demersal fish populations conducted by the 6 countries . The data, albeit limited, have served already as the basis for certain common national regulatory actions for the co-ordinated management of the fish stocks of the Gulf;
- definition of regional effluent standards based on a detailed survey of industries and recommendations made for the control and significant reduction of industrial pollution;
- deriving from the survey in (4) above, a successful campaign for reduction, recovery, recycling and re-use of industrial wastes based on the concept of the "waste stock exchange management system" was launched in Ghana as a cost effective waste management tool. The concept will be extended to other project countries;
- initiation of co-operative monitoring of the productivity of the LME using ships of opportunity. The results give indications of the carrying capacity of the ecosystem which enables projections on food security and by extension, social stability in the sub- region;
- preparation of coastal profiles for the 6 project countries, followed by the development of National Guidelines for Integrated Coastal Areas Management

(ICAM) and the preparation of draft national ICAM plans which were in different stages of adoption by the end of the Pilot Phase Project.

- establishment of cross-sectorial LME committees in the participating countries consistent with the cross sectorial approach implied in integrated management.
- accelerating the creation of national and regional data-bases, using harmonised architecture, as decision making support tools.
- facilitating the establishment of a functional non-governmental organisation (NGO) regional network.
- promoting active grassroots and gender participation in discussion, decision making and interventions in environmental and resources management ;
- active collaboration arrangements with other projects and organisations in the region;
- initiation of community-based mangrove restoration activities in all project countries
- successful completion of 41 training workshops with 842 participants (416 in regional workshops and 426 in National ICAM workshops), resulting in the setting up of a regional network of over 500 contactable specialists linked by electronic mail;
- development of a preliminary Transboundary Diagnostic Analysis (TDA) for the Gulf of Guinea.

Birth of a successor Project Moving from the GOGLME to the GCLME

Recognizing all the achievements of the pilot phase GOG-LME project as listed above, the Committee of Ministers responsible for the project during their First Meeting in Accra, Ghana in June 1998 called for initiation of an expanded project to include all 16 countries situated within the natural limits of the Guinea Current Large Marine Ecosystem. The communiqué issued after the meeting (The Accra Declaration) stated, among others, that "The development of a Strategic Action Plan including a full Transboundary Diagnostic Analysis leading to the second phase of the Project should be accelerated". In response to the Ministers' request, a PDF-B project "Development of a Strategic Action Programme for the Guinea Current Large Marine Ecosystem (GCLME)" was initiated in 2001 with the support of GEF, UNIDO, UNDP, UNEP and US-NOAA.

The Commanding Activity of the PDF Block-B Process was the organisation, in Accra, Ghana from 14-18 May 2001, of three back-to-back meetings namely the Working Group (WG), Stocktaking (SG) and Project Steering Committee (PSC), under the aegis of the Abidjan Convention for Co-operation in the Protection, Management and Development of the Marine and Coastal Environment of the West and Central African Region. The objectives of the meeting included the following:

- to review existing information relating to issues and problems of the marine and coastal environment of the GCLME, especially issues of transboundary nature;
- to examine on-going activities, projects and programmes addressing these issues and problems;
- to identify pilot projects for implementation; and
- to set national and regional strategies and priorities for action to be included in the Project Brief for a supplementary PDF-B or full project.

The stocktaking objectives covered areas beyond the GCLME geographic definitions. The Workshop was designed to bring together stakeholders not only from the GCLME region but also from the Canary Current LME (CCLME) region to the north and Benguela Current LME (BCLME) to the south in addition to representatives of some GEF projects in the greater western African coast from Mauritania to South Africa.

The Stocktaking Workshop was successful in affording:

- an "umbrella" under which the 16 countries of the Project established ownership of the Project and agreed on rudimentary mechanisms for consultation and coordination
- the first platform for the various regional GEF Projects to begin the important tradition of sharing lessons learned to date through experience and on a continuing basis as the implementation of GEF assisted projects in western Africa continue.
- an opportunity to discuss the issue of potential overlap between the GCLME Project and complementary GEF Projects in western Africa in order to achieve complementarity and avoid duplication.
- Presentation of a set of Initial Assessments for the 10 new countries and updated national profiles for the 6 pilot phase countries including a regional synopsis of tranboundary issues and priorities.
- Presentation and discussion of an initial compendium of 6 country-identified demonstration activities to be implemented in each of the six Pilot Phase countries and 3 regional demonstration activities that would have ecosystem-wide execution.
- the constitution of a GCLME-wide Steering Committee that provided guidance on the preparation of this PDF-B proposal and which will oversee subsequent phases of project development and implementation.

One of the principal outputs of the stocktaking process is the Regional Synthesis Report. The report highlights transboundary issues pertinent to the marine and coastal environment of the Guinea Current region and their root causes including the areas where priority management actions should be urgently undertaken. The report also provides background material necessary for the completion of the full Transboundary Diagnostic Analysis (TDA) and the preparation of a full Project Brief. This last objective takes account of the existence of a preliminary TDA developed during the pilot phase Gulf of Guinea LME project that involved six participating continues. The regional synthesis report thus describes the existing environmental and socio-economic situation in the GCLME based on the:

- questionnaires completed by experts from each of the 16 participating countries;
- country reports prepared by national experts;
- thematic area reports prepared by experts who were actively involved in the pilot phase Gulf of Guinea LME project and based on activities undertaken during the project;
- comments received from the various stakeholders that participated in the Working Group and Stocktaking Workshops.

The Thematic/Sectoral Reviews were provided by regional experts on the following areas:

- Plankton Survey in the Gulf of Guinea
- Nutrients and Water Quality
- Fish and Fisheries
- Industrial Pollution
- Mangroves
- Socio-economics and Governance
- Integrated Coastal Area Management (ICAM)
- Coastal Erosion
- Geographic Information System
- Information Communication Technology and
- Capacity Building

The bulk of the initial allocation of PDF Block-B funds were used to assure the planning and

successful organisation of the Stocktaking Workshop. Thus, It was recognised up-front during the approval of the PDF Block-B Activity that the financial requirement for the Stocktaking Workshop limited funding for the other tasks of preparing a 16 country TDA and Project Brief for a full project and that it was likely that a extra funds would be required to further the stakeholders "buy in" process, define national and regional demonstration project options, and to complete a full scale project brief and ultimately the IAs' respective Project Documents. With the recommendation of the Working Group and Stocktaking Workshops and the endorsement of the Project Steering Committee, UNIDO, UNDP, UNEP and US-NOAA finalised the supplementary PDF B which was approved by GEF in November 2002.

The objectives of the supplementary PDF B include to:

- Complete a full Transboundary Diagnostic Analysis (TDA) for the entire 16 country region and a stakeholder involvement plan,
- Define environmental quality objectives that will provide the first step in an adaptive management strategy for the LME to be encapsulated in the Strategic Action Programme (SAP, to be fully developed within the first six months of the full sized project, along with a comprehensive set of process, stress reduction and environmental status indicators).
- Fully identify and define a set of 9 country and regional replicable and sustainable national and regional activities and approved by the Steering Committee (that will make a significant contribution to resolving the priority transboundary issues, conserving the fisheries resources and/or protecting globally significant aquatic biodiversity) and complete an analysis of their benefits, incremental costs and co-funding. These 9 demonstration projects will facilitate early implementation of selected elements of the SAP.
- Develop a regional approach for a Regional Programme of Action on Land Based Activities (RPA/LBA) to facilitate the preparations of National Action Plans that will lead to the formulation and endorsement of a new Protocol on LBA for the Abidjan Convention, in conformance with an ecosystems approach to the assessment and management of the GCLME.
- Enable the preparation of the Project Brief and respective IA Project Documents.
- Develop full project activities to assist the Secretariat of the Abidjan Convention to develop the necessary capacity to coordinate and sustain implementation of the SAP following cessation of GEF support.

The full phase GCLME project would assist these 16 countries in making changes in the ways that human activities are conducted in the different sectors to ensure that the GCLME and its multi-country drainage basins can sustainably support the socio-economic development of the region. A project goal would be to build capacity of Guinea Current countries to work jointly to define and address transboundary priority environmental issues within the framework of their existing responsibilities under the Abidjan Convention and its Protocol. It is clear from the results of the stocktaking workshop that the participating countries endorse the need to recover depleted fish stocks, restore damaged coastal habitats, and control coastal pollution.

ANNEX C: List of Ongoing and Past Projects Relevant to the Implementation of the TDA

1. Project EP/GLO/201/GEF/FAO

***Title**: Reduction of Environmental Impact from Tropical Shrimp Trawling, through the Introduction of By -catch Reduction Technologies and Change of management"*

Participating countries

This project involves 13 countries: 7 for full participation (Nigeria, Iran, Venezuela, Costa Rica, Mexico. Indonesia and Philippines) and 6 others that will participate to the Project through joint activities with one of the main partners (Cameroon, Barhain, Colombia Cuba, Trinidad and Tobago). Two countries of the GCLME i.e. Cameroon and Nigeria are involved in this project. These countries are characterized by the fact that they actively participated at preparatory phase, and also have important shrimp fisheries, but the catches are generally smaller than for the main participating countries.

Project Objectives

This Project will address the problem *of* discarding unwanted by-catch and juvenile food fish in particular through the introduction of appropriate fishing technologies and practices, in combination, where appropriate, with introduction of legislation and a management framework including control and enforcement strategies.

The overall objective of the Project is then to reduce discard of fish captured by shrimp , trawlers, primarily by introducing technologies that reduce the catch of juvenile food fish secondary through management and research in the biology of the exploited resources and fishing gear fields.
The ultimate output of the project will be the adoption by several of the participating countries of fishing technologies and practices that are environmentally friendly, so that their shrimp trawling fisheries will enhanced in terms of the environmental performance and reduction of biological impacts and be regarded as more sustainable in the future a direct outcome of the project will be the reduction in number of juveniles caught by trawlers using BRDs (By – catch Reduction Devices) compared to trawlers not using such devices.

Outcome of the project

Part of the overall Work-plan of project EP/GLO/201/GEF is to monitor in each participating country:

- The ongoing evolution of the commercial shrimp trawling fisheries, covering the number of each major type of vessel involved, estimates of fishing effort and records of their landings;
- The typical rate of shrimp-catch, by-catch and discards made over an annual cycle by typical vessels from each main sector of the commercial shrimp-trawling fleet, both before, and after adoption of By-catch Reduction Devices (BRDs) by these vessels;

- The socio-economic changes which may be brought about by the adoption of BRDs in the commercial shrimp – trawling fleets:

Possible linkages

This project will be very useful for the assessment and sustainable management and conservation of biodiversity regional project for data collection since arrangements have been made with industrial fishing companies to use their vessels to collect data and information. The GCLM project should also use this approach with regard to fishing industries

2. Global International Water Assessment (GIWA)(GEF-UNEP**)**

What is GIWA?

GIWA is the GEF/UNEP project; it makes a major contribution to policies and actions that will lead to protection and more sustainable use of international waters; the products of GIWA are expected to represent the most objective comprehensive assessment of transboundary water issues, and their societal root causes, conducted so far.

GIWA carries out collection of data and their processing in 66 sub-regions simultaneously, makes full use of existing assessments and all other available information, incorporate the findings of past water-related programmes and work in close partnership with ongoing programmes to maximize the overall benefit.

The Gulf of Guinea is one of the 66 sub-regions identified by GIWA (Sub-region 42). The GIWA work so far in the Gulf of Guinea concern water assessment of the four basins within the Gulf of Guinea, notably: Congo Basin, Volta Basin, Niger Basin and the Comoe Basin. In each of these basins, environmental assessment of water based on GIWA methodology has been done: assessment of key environmental concerns and issues. Problem areas identified are. I) Freshwater shortage; ii) Pollution; iii) Habitat and community modification; iv) Unsustainable exploitation of fisheries and other living resources and v) Global change

Possible linkages

Information gather by GIWA will be very useful to finalize the TDA and other aspects of the project. Within the UNEP context, the Regional Seas Programme which includes 13 conventions and action plans and involves more than 40 states; the Global Programme Action for Protection of the Marine Environment from Land-based Activities; the programmes for the management of a number of transboundary river basins as well as number of conventions for which UNEP provides the secretariat

3. Ocean Data and Information Network for Africa, Second Phase (ODINAFRICA-II)
IOC/UNESCO/Government of Flanders

Objectives of ODINAFRICA-II

ODINAFRICA-II is an initiative of 20 African coastal states (12 in the west and Central Africa and Mediterranean: Tunisia, Morocco, Senegal, Guinea Conakry, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon, Gabon and 8 in East Africa: Kenya, Tanzania, Madagascar, Seychelles, Comoros, Mozambique, South Africa, Mauritius). The overall objective of the project

is to reinforce capacity building of participating countries on ocean data and information management by providing them will adequate training, equipment and internet facilities; create national data center with aim to collect, analyze and disseminate ocean data and information. A network of scientists and institutions has been established within these countries

Possible linkages

Eight countries of the GCLME are part of ODINAFRICA-II project; the 6 countries that participated in the first phase of the GOGLME are also part of ODINAFRICA. The network put in place will be very useful for the implementation of the GCLME and also will bear some cost.

4. **Control of Exotic Aquatic Weeds in Rivers and coastal Lagoons to Enhance and Restore Biodiversity in Côte d'Ivoire (**UNDP-GEF-Biodiversity)

The infestation of bodies of water by invasive aquatic plants (IAP) initially observed in the early 1980s is now reaching alarming proportions. The main invasive species is *Eichhornia crassipes* but *Salvinia molesta* and *Pitia stratiotes* have also been observed, as have other species (*lotus, nymphaea*, etc) These weeds are seriously impacting the life of riparian human population; they also pose threat to aquatic life. Some freshwater bodies are entirely covered. Aquatic life is also impacted by chemical shock in the lagoons brakish water where large quantities of water hyacinth are carried by floods and accumulate to rot. It is necessary to preserve the very rich but as yet little known biodiversity of the Ivorian ecosystems

Possible synergies should be develop between the GCLME and this project in the context of aquatic biodiversity conservation, pollution

5. **Coastal wetlands management in Ghana (**UNDP-GEF-International Waters**)**

Design and implementation of a Coastal Zone Management Plan to protect five environmentally sensitive and threatened coastal Ramsar sites of global importance for migratory birds. The project includes: a) monitoring of ecological conditions at the sites; b) preparation and implementation of site management programs and the training of site managers and wardens; and c) relocation of a sewage plant outlet that would have discharged into Sakumo Lagoon.

Possible linkages: collaboration will be developed between the GCLME, in particular the demonstration project on mangrove in Nigeria and the integrated coastal zone management project in Cameroon and the Ghana project.

6. **Reversing Land and Water Degradation Trends in the Niger Basin** (UNDP-World Bank-GEF-International waters)

The objective of this project is the sustainable development of the Niger Basin and the protection of its dry land and aquatic resources and associated biodiversity; the project will support the nine riparian countries which include the following GCLME countries: Benin, Cameroon, Côte d'Ivoire, Guinea Conakry, Nigeria

Possible linkages: countries cited above should at their national level develop synergies with this project with aim to avoid duplication of activities and also to learn from their experience

7. Integrated management of the Volta River Basin (UNEP/UNDP-GEF-International Waters)

The objective of the proposed project is to facilitate the establishment of a multi-country management framework, to produce a diagnostic of main transboundary issues, and to define agreed measures to reverse/prevent resources degradation (Strategic Action programme). The GCLME countries involved in this project are: Benin, Côte d'Ivoire, Ghana, and Togo

Possible linkages: countries cited above should at their national level develop synergies with this project with aim to avoid duplication of activities and also to learn from their experience

8. African Water Page

The main objective of the African Water Page, published by the Water Policy International is to increase communication on the Continent of Africa between people working on water. However, the level of connectivity to the Internet is very low. With other forms of communication being a difficulty, the Internet adds enormous potential to data accessibility for professionals, particularly those working in Government service. Not only is data more accessible, but with email, News Groups and WWW communication between sector professionals can also be enhanced. There is a distinct sense of isolation of people working, sometimes against daunting odds, in countries all around Africa. As the African Water Page develops, one of the objectives is to encourage African professionals to become members of a closed forum for sharing of information and support, and to promote frank discussion about some of the difficulties facing African professionals.

Possible linkages: this will be important for dissemination of the project information; the regional project on information should establish collaboration with African Water page and gain for their experience

9. Major intergovernmental agreements in the GCLME

9.1. Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region

Under the Abidjan Convention, adopted in 1981 and in force 1984, the contracting Parties agree to take all appropriate measures to prevent, reduce, combat and control pollution of the Convention area and to ensure sound environmental management of natural resources using for this purpose the best practicable means at their disposal, and in accordance with their capabilities. There is one protocol to the Convention: protocol concerning cooperation in combating pollution in cases of emergency, adopted in 1981 and in force in 1984

9.2. Convention Creating the Niger Basin Authority

The Convention, adopted in 1980 and in force in 1982, creates the Authority. Its aim is to promote the co-operation among member States and ensure an integrated development of the Niger Basin in all fields, by developing its resources particularly in the fields of energy, water resources, agriculture, animal husbandry, fishing and fisheries, forestry nd forestry exploitation, transport, communications and industry. The Authority is directed to the harmonization of national development policies in the basin through the implementation of integrated development projects and programmes. The protocol relating to the Development Fund of the Niger Basin was adopted with the Convention in 1980.

9.3. International Convention for the Conservation of Atlantic Tunas

This Convention was adopted 1966 and entered into force in 1969. The purpose of the Convention is the conservation of the resources of tuna-like fishes of the Atlantic Ocean

9.4. International Commission for the Conservation of Atlantic Tunas (ICCAT)

This Commission was established in 1969, under the Convention, as an inter-governmental fishery organization responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. ICCAT is the only fisheries organization that can undertake the range of work required for the study and management of tunas and tuna-like fishes in the Atlantic. The Commission's work requires the collection and analysis of statistical information relative to current conditions and trends of fishery resources in the Convention area

Possible linkages: Most of the countries within the GCLME are signatory of these conventions and commissions. The GCLME should take advantage of existence of these conventions and commissions and develop collaboration for sharing experience develop synergies with aim to protect and conserve the CGLME

10. Other projects

10.1. Conservation and sustainable use of forest ecosystems of central Africa region project (Le projet (ECOFAC) financing by European Union;

10.2. Programme of protection and development of marine and coastal environment for West and Centre Africa region (WACAF) jointly implemented by FAO and UNEP in collaboration with UNESCO and IUCN

10.3. Maritime Fisheries project implemented by FAO within the frame work of the COREP (Fishery Committee of the Gulf of Guinea) with the head office in Libreville, Gabon.

10.4. Tropical Forestry Action Programme(PAFT) , a regional initiative with national component and supported by OIBT(Organisation International des Bois Tropicaux) and various donors

10.5. Regional project on on Environmental Information management (PRGIE) implemented within the framework of GEF World Bank in collaboration with FAO and USAID

10.6. Central Africa Regional project on Environment (CARPE), an initiative of USAID for the countries of the Congo Basin

10.7. Sustainable Management of Central Africa Wetland Forest Ecosystems Programme implemented by IUCN, with GEF support

Possible linkages: there is no framework of coordination to avoid duplication. The GCLME is an opportunity to develop synergies and collaboration mechanism with all these initiatives.

ANNEX D: List of Acronyms

ACOPS	Advisory Committee for the Protection of the Seas
AfDB	African Development Bank
APR	Annual Programme/Project Report
BCLME	Benguela Current Large Marine Ecosystem
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CCLME	Canary Current Large Marine Ecosystem
CECAF	Fishery Committee for the Eastern Central Atlantic
CEDA	Centre for Environment and Development in Africa
COMARAF	Training and Research for the Integrated Development of African Coastal Systems
CPUE	Catch per Unit Effort
CTA	Chief Technical Advisor
DIM	Data and Information Management
EIA	Environmental Impact Assessment
EQO	Environmental Quality Objective
ESI	Environmental Status Indicator
FAO	Food and Agriculture Organization of the United Nations
FEDEN	Foundation for Environmental Development and Education in Nigeria
GCC	Guinea Current Commission
GCLME	Guinea Current Large Marine Ecosystem
GEF	Global Environment Facility
GIS	Geographic Information System
GIWA	Global International Waters Assessment
GOG-LME	Gulf of Guinea Large Marine Ecosystem
HAB	Harmful Algal Bloom
IA	Implementing Agency
ICAM	Integrated Coastal Areas Management
ICARM	Integrated Coastal Area and River Basin Management
ICS-UNIDO	International Centre for Science and High Technology - UNIDO
ICZM	Integrated Coastal Zone Management
IGCC	Interim Guinea Current Commission
IMC	Inter-Ministerial Committee
IMO	International Maritime Organization
IOC-UNESCO	Intergovernmental Oceanographic Commission of UNESCO
IUCN	The World Conservation Union
IW:LEARN	International Waters (IW) Learning, Exchange and Resource Network Program
LBA	Land-Based Activities
LME	Large Marine Ecosystem
LOICZ	Land-Oceans Interactions in the Coastal Zone
M&E	Monitoring and Evaluation
MOU	Memorandum of Understanding
MPPI	Major Perceived Problems and Issues
NAP	National Action Plan

NEAP	National Environmental Action Plan
NEPAD	The New Partnership for Africa's Development
NFP	National Focal Point
NGO	Non-governmental Organization
NPA/LBA	National Programme of Action/Land-Based Activites
NOAA	National Oceanic and Atmospheric Administration
OP	Operational Program
PCU	Project Coordination Unit
PDF	Project Development Facility
PI	Process Indicator
PIR	Project Implementation Review
PPER	Project Performance and Evaluation Review
PSC	Project Steering Committee
RCU	Regional Coordination Unit
RPA/LBA	Regional Programme of Action/Land-Based Activities
SAP	Strategic Action Programme
TDA	Transboundary Diagnostic Analysis
UNDESA	United Nations Department of Economic and Social Affairs
TPR	Tri-Partite Review
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WACAF	West and Central African Action Plan
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

ANNEX J

COPIES OF GEF OPERATIONAL FOCAL POINT ENDORSEMENT LETTERS

ANGOLA

REPÚBLICA DE ANGOLA

MINISTÉRIO DA ENERGIA E ÁGUAS

GABHIC - GABINETE PARA ADMINISTRAÇÃO DA BACIA HIDROGRÁFICA DO RIO CUNENE

TELEFAX N° 43-1-26026-6819 **OUR REF. 01/GCLME/00**
DAT: 29th SEPTEMBER 2003

DR. CARLOS MAGARINOS
UNIDO, VIENNA, AUSTRIA.

Dear Dr. Magarinos

GEF NATIONAL FOCAL POINT ENDORSEMENT THE STRATEGIC ACTION PROGRAMME - Integrated Management, Sustainable Development and Protection of the Guinea Current Large Marine Ecosystem (GCLME).

I, Armindo M. Gomes da Silva, as GEF Focal Point in Republic of Angola, hereby grant my full support and full endorse for the GCLME Project Brief and Strategic Action Programme, approved by the Ministers on behalf of the Republic of Angola, respectively, Minister of Fisheries and Minister of Environment, on 2nd March 2001.

Yours

Armindo Mario Gomes da Silva
General Director of the GABHIC
GEF National Focal Point
E-Mail:amgs-cg@netangola.com

Telefax:2442334461

C.C. Dr. Chica Ukwe, UNDP, Vienna, Austria-Fax: 43-1-26026-6819.

BENIN

République du Bénin

MINISTERE DE L'ENVIRONNEMENT, DE L'HABITAT ET DE L'URBANISME
FONDS POUR L'ENVIRONNEMENT MONDIAL
POINT FOCAL OPERATIONNEL

Téléphone: (229) 31 46 59
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N° 017/PFO-B/MEHU/SG/SA

Cotonou, le 12 AOUT 2003

Au

Docteur Carlos MAGARINOS
Directeur Général, ONUDI, VIC,
Box 300, A-1400, Vienne, Autriche
Fax 43 1 26026 6819

Objet : Endossement pour le Document de Projet du FEM portant sur la « Lutte contre la Dégradation des Zones Côtières et la Réduction des Ressources Vivantes dans le Grand Ecosystème Marin du Courant de Guinée (GEM-CG), par des Actions Régionales ».

Cher Monsieur,

En ma qualité de Point Focal Opérationnel FEM de la République du Bénin, je voudrais vous notifier par la présente, notre endossement pour le Document de Projet du FEM portant sur la « Lutte contre la Dégradation des Zones Côtières et la Réduction des Ressources Vivantes dans le Grand Ecosystème Marin du Courant de Guinée (GEM-CG), par des Actions Nationales et Régionales ».

L'exécution de ce projet contribuera à la mise en œuvre des politique, stratégie et programme mis en place au Bénin en la matière.

Le projet s'inscrit donc parfaitement dans le cadre de la préservation des Ressources Naturelles et intéresse particulièrement le Bénin dont les ressources de la zone côtière sont menacées à cause des pressions qui y sont faites.

Veuillez agréer, Monsieur, l'expression de mes sentiments distingués.

Ampliations :
Monsieur Christophe CREPIN,
Chargé des Projets FEM à la Banque Mondiale,
Fax : 1 202 4738185
E-mail : ccrepin@worldbank.org

Monsieur Chika Ukwe
Industrial Development Officer (International Waters)
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République du Bénin - Fonds pour l'Environnement Mondial - Point Focal Opérationnel

Pascal Zounvèou YAHA
Point Focal Opérationnel FEM

CAMEROON

REPUBLIQUE DU CAMEROUN

Paix-Travail-Patrie

MINISTERE DE L'ENVIRONNEMENT ET DES FORETS

SECRETARIAT GENERAL

CELLULE DE SUIVI

Point Focal Opérationnel du FEM

N° 1721 /MINEF/SG/CS/PFO-GEF

Objet : Endossement du Projet GEM-CG

REPUBLIC OF CAMEROON

Peace-Work-Fatherland

MINISTRY OF ENVIRONMENT AND FORESTRY

SECRETARIAT GENERAL

FOLLOW UP UNIT

Operational Focal Point of GEF

Yaoundé, le 12 SEP. 2003

Le Point Focal Opérationnel GEF

A

Dr. Carlos Magarinos
Directeur Général ONUDI
Vienna International Centre,
Box 300, Vienna, Austria
Fax : 43 1 26026 6819

Monsieur le Directeur Général,

Après examen de la mouture du **Projet Régional sur la lutte contre la Dégradation des Zones Côtières et la Réduction des Ressources Vivantes dans le GEM.CG, par des Actions Régionales** soumis à mon approbation par l'ONUDI, le PNUD et le PNUE.

J'ai l'honneur, en ma qualité de **Point Focal Opérationnel du FEM/GEF**, de vous saisir par la présente, à titre d'endossement de cet important projet, pour vous informer que ledit projet correspond aux préoccupations nationales de mon Pays.

Toutefois, je tiens à faire les observations suivantes dont la prise en compte dans sa phase de mise en œuvre me paraît nécessaire non seulement pour impliquer davantage les principales parties prenantes à la gestion de ce projet mais aussi, en vue d'une mise en oeuvre durable du projet au niveau des localités bénéficiaires.

En effet, Il est souhaitable que le Ministère de l'Environnement et des Forêts qui a la charge de la gestion de la conservation de la

biodiversité au Cameroun soit parmi les premiers concernés dans ce projet à fort impact sur la biodiversité et la protection de l'environnement aquatique national. Par conséquent, il est nécessaire de l'inscrire au niveau des Agences Nationales d'Exécution, pour permettre notamment au ***Point Focal Opérationnel du GEF*** *de suivre,* ***conformément au plan d'action stratégique annuel de ce dernier, qui sera connu dans les prochains jours avec la mise en place du Comité National du GEF****, la mise en œuvre de ce projet et être à même d'informer permanemment le GEF qui est le principal organisme de financement sur l'évolution dudit projet sur le terrain;*

Par conséquent, sous réserve des modifications à apporter par rapport à ces observations, nous ne trouvons aucun inconvénient à ce que le Fonds pour l'Environnement Mondial (GEF) approuve ce projet et contribue financièrement à sa mise en œuvre effective au Cameroun.

Veuillez agréer, ***Monsieur le Directeur Général****, l'assurance de ma considération distinguée.*

Le Point Focal Opérationnel du FEM/GEF au Cameroun

NANTCHOU NGOKO Justin

CONGO DEMOCRATIC REPUBLIC

REPUBLIQUE DEMOCRATIQUE DU CONGO
MINISTERE DE L'ENVIRONNEMENT

Secrétariat Général à l'Environnement
et Conservation de la Nature

DIRECTION DE DEVELOPPEMENT DURABLE

LE POINT FOCAL OPERATIONNEL FEM

Kinshasa, le 15 AOUT 2003

N°059/SG.ECN/PFO/TS/ 2003

Transmis copie pour information à :

- Monsieur FRANK PINTO
  Coordinateur Exécutif du Projet PNUD/FEM
  à NEW-YORK / U S A
- Monsieur AHMED DJOGHLAF
  Coordonnateur Exécutif de PNUE/FEM
  à Naïrobi / KENYA

A Monsieur CARLOS MAGARINOS
Directeur Général de l'Organisation des
Nations Unies pour le Développement
Industriel (UNIDO)
V I C
BOS 300, A – 1400
Vienna / Austria
Fax : 043 1 26026 6819

OBJET : **Lettre d'approbation de PDF-B du projet de lutte contre la Dégradation des zones côtières et la réduction des ressources vivantes dans le grand Ecosystème Marin du Courant de Guinée (GEMCG) par des actions régionales**

Monsieur le Directeur Général,

Subsidiairement à la lettre n° 0425/CAB/V-Min/ECNPF/00 de Son Excellence Monsieur le Vice-Ministre à l'Environnement, j'ai l'honneur de vous confirmer notre accord pour que la

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B.P. 12 348 Kinshasa I - Téléphone 34.390, Tel. 9905957

République Démocratique du Congo soit éligible à la deuxième phase du Projet dont il est en question en marge.

La République Démocratique du Congo a choisi de travailler en étroite collaboration avec l'Organisation des Nations Unies de Développement Industriel (ONUDI), compte tenu des expériences acquises par votre institution, dans les domaines de la pollution et de la conservation de la biodiversité dans le Grand Ecosystème Marin.

Ce projet est d'une grande importance pour notre pays et nous y accordons un grand intérêt pour sa réalisation.

Veuillez agréer, Monsieur le Directeur Général, l'assurance de ma haute considération.

République Démocratique du Congo * Direction de Développement Durable * Ministère des Affaires Foncières, Environnement et Tourisme

KASULU SEYA MAKONGA

Point Focal Opérationnel FEM

Avenue Pumbu n° 35 Kinshasa / Gombe
B.P. 12 348 Kinshasa I - Téléphone 34.390, Tel. 9905957

CONGO

MINISTERE DE L'ECONOMIE FORESTIERE
ET DE L'ENVIRONNEMENT

DIRECTION GENERALE DE L'ENVIRONNEMENT

REPUBLIQUE DU CONGO
Unité – Travail – Progrès

N° 174 /MEFE/DGE

Brazzaville, le 04 AOUT 2003

Le Directeur Général de l'Environnement

A

Monsieur le Coordonnateur du Programme des Eaux Internationales auprès de l'ONUDI
P.O. Box 300, A-1400
Vienne, Autriche

Fax : +43-1-26026 6819

OBJET : Endossement du document de projet GEM-CG.

Monsieur,

Dans le cadre de la finalisation du processus PDF-B du projet « Grand Ecosystème Marin du Courant de Guinée » (GEM-CG),

J'ai l'honneur, en ma qualité de Point Focal Opérationnel du FEM pour le Congo, d'endosser par la présente le document dudit projet, aux côtés d'autres pays bénéficiaires du don, afin qu'il soit soumis au Conseil du Fonds pour l'Environnement Mondial (FEM/GEF), lors de sa seconde session annuelle.

Je vous prie, Monsieur, de recevoir mes salutations les meilleures.

République du Congo – Unité, Travail, Progrès – LE DIRECTEUR GENERAL – Direction Générale de l'Environnement

Joachim OKOURANGOULOU

COTE D'IVOIRE

POINT FOCAL OPERATIONNEL
DU FONDS POUR L'ENVIRONNEMENT
MONDIAL (PFO/FEM)

REPUBLIQUE DE COTE D'IVOIRE
Union - Discipline - Travail

Abidjan, le 10 SEP. 2003

Réf : [redacted] 2 6 8 3 PFO/FEM/KA/YA

OBJET : Lettre d'appui
Projet Grand Ecosystème
Marin du Courant de Guinée

à

Monsieur FRANCK PINTO
Coordinateur Exécutif
Coordination office
UNDP/GEF

NEW YORK

Monsieur le Coordonnateur Exécutif,

Dans le cadre de la lutte contre la pollution des eaux et la préservation de la Biodiversité du Grand Ecosystème marin du courant du Golfe de Guinée, la Côte D'Ivoire fait partie des pays ayant participé à la première phase du projet financé par le FEM de 1995 à 1998.

Suite à la réunion régionale du Comité Directeur du Projet organisé récemment à Abuja (Nigeria), les pays ont décidé de solliciter à nouveau, un financement de type PDF B du FEM en vue de la poursuite du projet.

Compte tenu du bénéfice environnemental global lié à la réalisation de ce projet sur les côtes ivoiriennes victimes de l'érosion marine, nous proposons ce projet au financement du FEM.

Ce projet est d'une grande importance pour notre pays et nous y accordons un grand intérêt pour sa réalisation et souhaitons vivement son adoption pour ce financement.

Veuillez agréer, Monsieur le Coordonnateur Exécutif, l'assurance de ma considération distinguée.

Le Coordonnateur du Point Focal
Opérationnel du FEM

POINT FOCAL OPERATIONNEL F.E.M

KONE Alimata

liations :

Monsieur le Président Directeur Général du FEM
Madame la Ministre d'Etat, Ministre de l'Environnement
Monsieur le Directeur Général de la CAA, Administrateur du FEM pour la Côte D'Ivoire
Monsieur le Coordonnateur Exécutif du FEM au PNUE
Monsieur CHIKA UKWE, Industrial Development Officer (International Water) ONUDI

Immeuble SCIAM 12ème étage, porte 27 Tél : (225) 20-20-98-29/30 Fax : (225) 20-21-35-78

GABON

MINISTERE DE L'ECONOMIE FORESTIERE, DES EAUX,
DE LA PECHE CHARGE DE L'ENVIRONNEMENT
ET DE LA PROTECTION DE LA NATURE

SECRETARIAT GENERAL

DIRECTION GENERALE DE
L'ENVIRONNEMENT

N° 00252 /MEFEPEPN/SG/DGE.-

REPUBLIQUE GABONAISE
Union-Travail-Justice

Lettre d'endossement auprès du GEF pour le financement du Projet Grand Ecosystème Marin du Courant de Guinée (GEM CG).

Soumise par Son Excellence Monsieur Emile DOUMBA, Ministre de l'Economie Forestière, des Eaux, de la Pêche, chargé de l'Environnement et de la Protection de la Nature, ***Point Focal Politique GEF.***

Personne à contacter : Monsieur Chris MOMBO NZATSI, Directeur Général de l'Environnement, ***Point Focal Opérationnel GEF***

Téléphone : (241) 72-27-00
FAX : (241) 76-55-48
Adresse Electronique : dge.gabon@laposte.net / chris.mombo@laposte.net
Adresse postale : Boulevard Triomphal BP : 3903, Libreville/Gabon.

Argumentaire :

Situé sur la côte occidentale de l'Afrique Centrale, le Gabon fait partie des pays du Golfe de Guinée. Sa façade maritime s'étend sur 850 km, ce qui est relativement important au niveau de la sous-région.

La protection des zones côtières est une préoccupation permanente des Gouvernements des seize (16) Pays du Grand Ecosystème Marin du Courant de Guinée (GEM-CG). Aussi, les investigations faites par le Programme des Nations-Unies pour l'Environnement (PNUE), révèlent-elles que les pays inclus dans cette façade maritime sont exposés à un risque similaire : le phénomène de pollution qui représente l'une des causes de la dégradation des écosystèmes côtiers.

Une récente étude réalisée par le Programme des Nations Unies pour l'Environnement (PNUE), du Nigeria au Gabon évalue la longueur de la côte gabonaise à 38%, et la surface du plateau continental (dont la longueur atteint 50m) à 45%. En ce qui concerne la pente moyenne, elle est de 0,2%. Enfin la zone économique exclusive (ZEE) atteint 22% (265000 km² d'espace maritime).

Le Gabon a entrepris depuis quelques années, un certain nombre d'exercices de planification dont les plus importants sont : le Plan National d'Action pour l'Environnement (PNAE), la Stratégie Nationale sur la Diversité Biologique et la Communication Nationale sur les Changements Climatiques. En outre, il est prévu la création d'un Observatoire Côtier au sein duquel un certain nombre de travaux sont préconisés, par exemple la réalisation de la cartographie de la zone côtière.

Le Gouvernement du Gabon en collaboration avec l'Organisation des Nations Unies pour le développement Industriel (ONUDI) ont formulé un projet de financement et de co-financement du Projet GEM CG. Cette requête de financement s'élève à un montant de **1,820,000 $ US G**.

Autres informations utiles sur le Gabon :

Le Gabon a ratifié un certain nombre de Conventions relatives à la protection des écosystèmes côtiers et marins, entre autres :

- La Convention Internationale du 29 novembre 1969 sur les responsabilités civiles pour les dommages relevant de la pollution par les hydrocarbures ;
- La convention de Bruxelles du 29 novembre 1969 sur l'intervention en haute mer en cas d'accident entraînant ou pouvant entraîner une pollution par hydrocarbures ;
- La Convention Internationale du 18 décembre 1971 portant création d'un Fonds International d'indemnisation des dommages dus à la pollution par les hydrocarbures
- La Convention du 13 novembre 1972 sur la prévention de la pollution des mers résultant de l'immersion des déchets ;
- La Convention d'Abidjan du 23 mars 1981, relative à la coopération en matière de protection et de mise en valeur du milieu marin et des zones côtières de l'Afrique de l'Ouest et du Centre ;
- La Convention sur le Commerce International des espèces de faune et de flore sauvages menacées d'extinction ratifiée le 15 mai 1989 ;
- La Convention de RAMSAR sur les Zones Humides ratifiée en 1971.

C'est pourquoi, je soumets à votre Haute appréciation la Lettre d'endossement du Gabon au projet Grand Ecosystème Marin du Courant de Guinée (GEM CG) pour un montant de **1,820,000 dollars US**.

Haute Considération.

Fait à Libreville, le 0 8 AOUT 2003

Le Directeur Général de l'Environnement

Chris MOMBO N

GHANA

Tel: 666049/662013
Fax: 666828
Our Ref: MES/1A/035/V 7
Your Ref:

REPUBLIC OF GHANA

MINISTRY OF ENVIRONMENT, SCIENCE & TECHNOLOGY
P. O. Box M 232
Accra

July 31, 2003

MR. CHIKA UKWE
INDUSTRIAL DEVELOPMENT OFFICER
UNIDO
P. O. BOX 300
A-1400 VOEMMA
AUSTRIA

Dear Sir,

REQUEST FOR ASSISTANCE IN OBTAINING COUNTRY ENDORSEMENT OF GCLME PROJECT BRIEF

I refer to your e-mail of 25th July, 2003, on the above subject.

I wish to inform you that the Government of the Republic of Ghana fully endorses the Guinea Current Large Marine Ecosystem Project Brief.

Yours faithfully,

E.O. NSENKYIRE
NATIONAL GEF FOCAL POINT
NATIONA PROJECT DIRECTOR, GCLME

GUINEA

MINISTERE DES MINES, DE LA GEOLOGIE
ET DE L'ENVIRONNEMENT

DIRECTION NATIONALE
DE L'ENVIRONNEMENT

N° 077 /MMGE/DNE/ 03

REPUBLIQUE DE GUINEE
Travail - Justice - Solidarité

Conakry, le 1er/08 2003

Le Directeur National

A Monsieur Frank Pinto
Executive Coordinator
UNDP/GEF

Objet: Lettre d'endossement au PDF bloc B du Projet du FEM
« Lutte contre la dégradation des zones côtières et la réduction des ressources vivantes dans le Grand Ecosystème Marin du Courant de Guinée par des Action Régionales (GEM-CG) »

Monsieur,

J' ai l'honneur de vous transmettre ci-joint, la lettre d'endossement du projet FEM sur le Courant de Guinée (GC- LME) de Madame Kadiatou N'Diaye, Point Focal Opérationnel National du FEM.

Tout en appréciant les documents de projet dont l'Analyse Diagnostique *Transfrontalière (ADT), le Programme d'Action Stratégique* (PAS), les trois projets de démonstration régionale et les six projets de démonstration nationale, le Point Focal Opérationnel National du FEM notifie tout son soutien à la demande de financement de ce gigantesque projet.

Veuillez agréer, Monsieur, l'expression de ma haute considération.

Direction Nationale de l'Environnement ★ Le Directeur ★ M.M.G.E CONAKRY - R.G.

Mamadouba SYLLA

Siège : CONAKRY Route du Niger, Quartier Lansèboundji, face ENAM
B.P : 3118 Tél : (224) 46 - 48 - 50 Télécopieur : (224) 45 - 15 - 89/41 - 49 - 13

MINISTERE DES MINES DE LA GEOLOGIE ET DE L'ENVIRONNEMENT

N° № 0 9 6 3 /MMGE/CAB/

REPUBLIQUE DE GUINEE
Travail - Justice - Solidarité

Conakry, le 01 AOUT 2003

Le Ministre

Monsieur .Frank Pinto
Executive Coordinator UNDP/GEF
Programme des Nations Unies
pour le Développement(PNUD)
One, UN Plaza N.Y. 10017
New York, USA.

Objet: **Lettre d'endossement au PDF-B du Projet du FEEM « Lutte contre la dégradation des zones côtières et la réduction des ressources vivantes dans le Grand Ecosystème Marin du Courant de Guinée par des Actions Régionales (GEM-CG).**

Monsieur,

C'est avec un réel plaisir que nous avons accueilli l'ouverture de ce vaste projet à l'ensemble des pays du Golfe de Guinée, parmi lesquels figure la Guinée, car les problèmes environnementaux à l'intérieur du courant de Guinée nous interpellent tous

Tout en appréciant les activités escompté dans les Documents de projet dont l'Analyse Diagnostique Transfrontalière (ADT), le Programme d'Action Stratégique (PAS), les trois projets de démonstration régionale et les six projets de démonstration nationale, je confirme par la présenté l'intérêt que le Gouvernement guinéen accorde à ce projet.

Je voudrait à cet égard , vous notifier mon soutien à la demande de financement de ce projet. Mon département, chargé de l'environnement mettra tout en œuvre pour la réussite effective de ce programme.

Veuillez agréer, Monsieur, l'expression de mes sentiments les meilleurs.

P, le Ministre.PO
Le Secrétaire Générale

MINISTERE DES MINES DE LA GEOLOGIE ET DE L'ENVIRONNEMENT
Le Secrétaire Général
Conakry R.G.

Alimou DIALLO

BP: 295 - Tél: (224) 41.25.13 - Télex : 22350 - MMGE - Fax : (224) 41.49.13 - Immeuble OFAB-CBG - CONAKRY

GUINEA BISSAU

Global
Environment
Facility

Ref.n.: 147 /DG4 /2003

Bissau, le 11 septembre 2003

Monsieur
Dr. Carlos Magarinos
Directeur Général
ONUDI
Box 300, A-1400
Vienne, Autriche
Fax. : 43-1-26026 3738

Objet : Endossement du document du projet RAF/00/G41 « GEM-CG »

En ma qualité de Point Focal Opérationnel du FEM pour le Gouvernement de la République de Guinée-Bissau, je voudrais vous informer que j'endosse officiellement le document du projet RAF/00/G41 « GEM-GC », afin qu'il soit soumis au Conseil du Fonds pour l'Environnement Mondial (FEM/GEF), lors de la seconde session annuelle.

Veuillez agréer, Monsieur le Directeur Général, l'expression de ma haute considération

Dra Matilde da Costa Jean Gomes Lopes

Directora Geral
Point Focal Opérationnel du GEF

GUINEA EQUATORIAL

REPUBLICA DE GUINEA ECUATORIA
MINISTERIO DE PESCA Y MEDIO AMBIENTE

Tel: +240-92953, Fax +240-91007

Num: 03-203-190

Ref.:

Secc.:

Malabo, 9 de abril de 2003

Muy Señor nuestro:

Para su posterior envío a la sede de la ONUDI, adjunto le remito el documento del Proyecto titulado Lucha contra la Degradación de Zonas Costeras y la Reducción de Recursos Vivos en el Gran Ecosistema Marino de Guinea Ecuatorial; firmado por el Gobierno de la República de Guinea Ecuatorial, en duplicado ejemplar.

Aprovecho la ocasión para reiterarle la expresión de mi más alta y distinguida consideración.

Fortunato OFA MBA
Ministro de Pesca y Medio Ambiente

UNDP
EQUATORIAL GUINEA
DATE 11 April 2003
REGISTRY N.º 1217
FILE 240/3700/00/00/03

	A	I	INIT	DATE
RR				
DRR				
PN				5/5
ACTION:				

Señor Representante Residente del PNUD
Malabo

Cc: Al Excmo. Señor Ministro de Asuntos Exteriores, Cooperación Internacional y Francofonía.

LIBERIA

NATIONAL ENVIRONMENTAL COMMISSION OF LIBERIA
P.O.BOX 4024
5TH Street, Sinkor
Monrovia, Liberia

30 July 2003

Dr. Carlos Magarinos
Director General
UNIDO
VIC Box 3200
A-1400, Vienna, Austria

Dear Dr. Magarinos;

Ref: **LETTER OF ENDORSEMENT SUBMITTED BY THE GEF NATIONAL OPERATIONAL FOCAL POINT FOR THE GUINEA CURRENT LAGRE MARINE ECOSYSTEM PROJECT (GCLME)**

I have the honour to present my compliments and to inform you that, in my capacity as the Global Environmental Facility (GEF) National Focal Point for Liberia, I hereby endorse the proposal to access funds for the Guinea Current Large Marine Ecosystem Project (GCLME).

Sir, we have participated in the process leading to the preparation of the documents of the proposed Guinea Current Large Marine Ecosystem project (GCLME). These documents include the following: The Project Brief, Transboundary Diagnostic Programme (DTA), Strategic Action Programme (SAP) and the three regional and six national demonstration projects.

Sir, please accept the assurances of my high esteem.

Kind regards;

Sincerely yours,

Fodee Kromah

Fodee Kromah, PhD
GEF National Operational Focal Point, and
***Executive Director*, National Environmental Commission of Liberia (NECOLIB)**

Fax: 231-226888-330489 Tel: 888-330489 Email: necolib@yahoo.com

NIGERIA

FEDERAL MINISTRY OF ENVIRONMENT

7TH & 9TH FLOOR, FEDERAL SECRETARIAT, SHEHU SHAGARI WAY
P. M. B. 468, GARKI, ABUJA

Telephone/Fax:
E -mail:

Ref. No. FMENV/EC/M4MM/418/X
Date: 8th August, 2003

Department of:

Dr. Carlos Magarinos
Director-General, UNIDO, VIC,
Box 300, A-1400, VIENNA, AUSTRIA,
Fax: 431 26026 6819

GEF OPERATIONAL FOCAL POINT ENDORSEMENT FOR THE GUINEA CURRENT LARGE MARINE ECOSYSTEM PROJECT

I am in possession of all the main documents of the PDF B for the Guinea Current Large Marine Ecosystem Project particularly the Transboundary Diagnostic Analysis (TDA), Strategic Action Programme (SAP) and the three regional and one national demonstration projects.

2. The proposed project is accordance with the extant national policies and plans on the environment and therefore considered to be of high priority.

3. With the express permission of the Government of the Federal Republic of Nigeria, I hereby endorse the GCLME proposal for funding by the Global Environment Facility.

Ayodele Adekunle OLOJEDE
GEF Operational Focal Point - Nigeria

SAO TOME & PRINCIPE

Global
Environment
Facility

Ponto Focal Operacional do GEF – São Tomé e Príncipe

To : Dr. Carlos Magarinos
Directeur General
ONUDI, VIC
BOX 300, A-1400,
Vienne, Autriche
Fax 43-1-26026 3738

S.Tomé, le 13 Août 2003

N/Refª 014/PFOGEF/2003

Objet : **Endossement du document du projet GEM-CG.**

En ma qualité de Point Focal Opérationnel du FEM pour le Gouvernement de la République Démocratique de S.Tomé et Principe, je voudrais vous informer que j'endosse officiellement le document du projet GEM-CG, afin d'être soumis au FEM. Nous sommes avertis que ce projet sera mis en œuvre par l'ONUDI.

Veuillez agréer, Monsieur le Directeur, l'expression de ma haute considération.

Lourenço Monteiro de Jesus
(Ponto Focal Operacional do GEF)

REPÚBLICA DE S. TOMÉ E PRÍNCIPE
MINISTÉRIO DA INFRA. REC. N. E AMBIENTE
GABINETE DO AMBIENTE

B.P. 408 – São Tomé – Tel. (239) 22 25 55/22 29 81/22 52 71 – gefamb@cstome.net

SIERRA LEONE

SIERRA LEONE GOVERNMENT

MINISTRY OF LANDS, COUNTRY PLANNING AND THE ENVIRONMENT
ENVIRONMENT PROTECTION DEPARTMENT
TEL: 232-22- 240367/240355,076-630784
FAX: 232-22-235013/235055

REF: MLCPE/EPD/ 71

DR CARLOS MAGARINOS
Director General,
UNIDO, VIC,
P.O. BOX 300,
A-1400,
VIENNA, AUSTRIA
FAX: 43 1 26026 6819

Dear Dr. Magarinos

ENDOSRSEMENT OF GEF PDF – B PROJECT FOR SIERRA LEONE – COMBATING LIVING RESOURCES DEPLETION AND COASTAL AREA DEGRADATION IN THE GUINEA CURRENT LME THROUGH REGIONAL ACTIONS

In my capacity as Global Environment facility (GEF) Operational Focal Point for Sierra Leone, I write to endorse the PDF – B Project for Sierra Leone to enable the country undertake the project titled "Combating Living Resources Depletion and Coastal Area degradation in the Guinea Current Large Marine Ecosystem Through Regional Actions".

Please be informed that the Environment Protection Department in collaboration with Government Line Ministries, regional Governments and key stakeholders in the environment have completed and submitted the PDF –B GCLME Project Country Contributions, Baseline activities and Cost for GCLME Countries and Co-Financing of the Project Components to UNIDO for your attention and onward submission to the GEF secretariat.

The Primary focus of GCLME Project Proposal underscores some of the goals of the countries National Environmental Policy (1994) which seeks to amongst others: restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere; preserve biological diversity and the principle of optimum sustainable yield in the use of living natural resources and ecosystems.

The project will therefore be of great help to Sierra Leone in conserving and utilizing the environment and natural resources for the benefit of present and future generations, and also assist Sierra Leone in developing and implementing strategic Actions Plans for the fisheries/marine/environment sector to enable us comply with the various international conventions.

Your cooperation in this matter is highly solicited.

Yours sincerely,

Stephen S.J. Jusu
Director of the Environment/GEF Operational Focal Point.

CC: Ahmed Djoghlaf, Director, DGEF UNEP P.O.BOC 300552 Gigiri, Nairobi Kenya. -FAX-254 2 624041/624042

TOGO

MINISTERE DE L'ENVIRONNEMENT
ET DES RESSOURCES FORESTIERES

POINT FOCAL OPERATIONNEL POUR LES ACTIVITES
DU FONDS POUR L'ENVIRONNEMENT MONDIAL (FEM)

N° 097/PFO-FEM

Objet: Endossement du projet Lutte contre la Dégradation des Zones Côtières et Réduction des Ressources Vivantes dans le GEM du Courant de Guinée par des Actions Régionales.

REPUBLIQUE TOGOLAISE
Travail-Liberté-Patrie

Lomé, le 07 AOUT 2003

Le point Focal

A

Dr CARLOS MAGARINOS,
Directeur Général, ONUDI, VIC,
BOX 300, A-1400, Vienne, Autriche
(FAX 43 1 26026 6819)

Monsieur le Directeur Général,

En ma qualité de Point Focal Opérationnel du FEM pour le Gouvernement du Togo, je voudrais vous informer que le Togo endosse le projet intitulé " **Lutte contre la Dégradation des Zones Côtières et Réduction des Ressources Vivantes dans le GEM du Courant de Guinée par des Actions Régionales".**

En espérant que la mise en œuvre de ce projet permettra de répondre aux attentes nationales et régionales des parties prenantes, je vous prie d'agréer, **Monsieur le Directeur Général,** l'expression de ma grande considération.

FOLLY Yao Djiwonu
Point Focal Opérationnel du FEM
BP 355 Lomé, Tél./Fax 228 2214604
Email : yfolly@yahoo.fr