

# GUINEA CURRENT LARGE MARINE ECOSYSTEM PROJECT



## REPORT OF THE MEETING OF THE REGIONAL WORKING GROUP ON POLLUTION AND ECOSYSTEM HEALTH

ACCRA, GHANA, 10 - 14 APRIL, 2006



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## **1. INTRODUCTION**

Approximately 40% of the Guinea Current Large Marine Ecosystem (GCLME) 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, 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 coastal fisheries.

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' activities; industrial, agricultural and urban effluents and domestic sewage and other mining activities such as oil and gas exploration (in particular, off the coasts of Angola, Cameroon, Gabon and Nigeria), resulting in the deterioration of water quality in the GCLME. However, there are still many questions about the sources and extent of land and sea- based pollution with no historical monitoring networks in the Guinea Current Large Marine Ecosystem to provide data needed to answer these questions.

It is against this background that the GCLME organized the Meeting of the Regional Working Group on Pollution and Ecosystem Health, held in Accra Ghana, in the Conference Room of the Regional Coordination Unit, from 10<sup>th</sup> to 14<sup>th</sup> April 2006, which constituted a scientific and technical forum for discussions on methodologies of pollution monitoring and reduction strategies.

## **2. OBJECTIVES**

- To identify and assess land and sea- based pollution and ecosystem health;
- To introduce the effects of pollution in coastal ecosystem, useful approaches to problem definition, and the importance of a regional perspective in the restoration and management of ecosystem health;
- To contribute to the development of capabilities regarding methodologies of pollution monitoring and reduction strategies;
- To discuss national case studies elaborated by participants;

- To determine and address training needs in the region for the prevention and control of land and sea based sources of pollution;
- To identify, strengthen and involve stakeholders in land and sea- based pollution issues in the region, including their involvement in monitoring and evaluation, as well as development of performance indicators.

During the Workshop, participating countries were expected to evaluate, improve and validate the “Training Manual on the Development of the National Programme of Action (NPA)” (February 2006 version) and the “Marine Pollution Monitoring Manual” (March 2006 version).

### **3. PARTICIPANTS**

Pollution experts from fourteen of the sixteen GCLME member countries took part in the Workshop namely: Benin, Cameroon, Congo, Democratic Republic of Congo, Cote d’Ivoire, Gabon, Ghana, Equatorial Guinea, Guinea, Liberia, Nigeria, Sao Tome & Principe, Sierra Leone and Togo (see Annex 4: List of Participants). The consultant for the Workshop was the Chairman of the GCLME Pollution and Ecosystem Health Working Group, Prof. Ayite Ajavon.

### **4. OPENING CEREMONY**

The official opening for the Meeting of the Regional Working Group on Pollution and Ecosystem Health was performed on Monday, 10<sup>th</sup> April 2006 at 9:45 a.m. by the Minister for Environment and Science, Hon. Christine Churcher and chaired by the Executive Director of the Environmental Protection Agency (EPA), Mr. Jonathan Allotey. Present at the ceremony were Prof. Alfred Oteng Yeboah, Deputy Director General for Environment and Health, Council for Scientific and Industrial Research (CSIR) and Prof. Ayite Ajavon, Chairman of the GCLME Pollution and Ecosystem Health Working Group.

The Chairperson cited pollution from land-based activities as one of the major concerns of countries in the GCLME region and emphasized efforts by the Government of Ghana, through the Ministry of Environment and Science and the EPA to combat pollution.

The Regional Director, Professor Chidi Ibe, thanked the Hon. Minister for her support and total commitment to combating pollution in the sub-region. Reiterating the mandate of the GCLME project, “Combating Living Resource Depletion and Coastal Area Degradation, through Ecosystem-based Regional Actions” he emphasized that the enormous marine resources potential and ecosystem health of the GCLME were being threatened by pollution. To the participants, he expressed gratitude for their continued support for the project and stressed that the main objective of the Workshop was to validate the two draft manuals, “Training Manual on the Development of the National Programme of Action (NPA)” and the “Marine Pollution Monitoring Manual”.

The Minister for Environment and Science underlined the importance of the trans-boundary approach in solving the problem of pollution in the region. She asked participants to take advantage of partnerships to build regional capacity to fully address transboundary environmental challenges, using appropriate techniques and strategies. She stated that this Workshop provided a platform for discussing the strengths and weaknesses in developing such sector specific policies to fully address these challenges (Annex 5).

## **5. ORGANISATION OF THE SESSION**

Participants examined in detail the draft agenda and adopted it with minor modifications (Annex 1). Four sub-Working Groups were formed to analyze each of the manuals. To ensure efficient inputs to each manual, the composition of the sub-Groups was based on individual specializations. Each sub-Group elected its Chairperson and a Rapporteur.

## **6. TECHNICAL SESSIONS**

### **6.1. DAY ONE**

The session was chaired by Dr. A.J. Ajao (Nigeria) while Dr. Osmund Ansa-Asare (Ghana) and Mr. Lamie K. Gaie (Liberia) were elected as Rapporteurs.

### **6.1.1. Country presentations**

Country reports were presented by 13 countries (Annex 2: Summary of Country Presentations, Annex 3: Country Presentation Format). Due to time constraints, the Chairman, Dr. Ajao asked presenters to limit their oral presentations to the format outlined below.

- Regular Monitoring Schemes
- Methods
- Equipment
- Regular Training
- Reporting
- How Useful is your Monitoring

From the country presentations, it was concluded that few countries have efficient pollution monitoring schemes in place. Also, the schemes in place are based mostly on water pollution. Information and data related to air and soil pollution are either not available or very scarce. The contribution of wet and dry depositions of nutrients loading from atmospheric pollution need to be assessed.

Participants unanimously agreed that there was the need for harmonization of pollution monitoring methodologies, for comparability and consistency of the results and therefore the need to have a standardized Pollution Monitoring Manual for the GCLME region.

### **6.1.2. Presentation of the two Manuals**

CEDA, the authors of the “Training Manual on the Development of the National Programme of Action (NPA)” presented it while SCAN Associates, authors of the “Marine Pollution Monitoring Manual” presented their manual.

Following the presentations, four sub-Groups were formed and each assigned the following chapters to assess:

- Training Manual for the Development of NPA
  - Group 1 - Chapters 7, 8, & 9
  - Group 2 - Chapters 5, 6, & 9
  - Group 3 - Chapters 3, 4, & 9

- Group 4 - Chapters 1, 2, & 9
- Marine Pollution Monitoring Manual
    - Group 1 - Chapters 1 & 2
    - Group 2 - Chapter 3 & 5
    - Group 3 - Chapter 4
    - Group 4 - Chapter 6

## **6.2. DAY TWO**

The sub-Groups continued the examination of the “Training Manual on the Development of the National Programme of Action (NPA)”, following which a plenary was convened in the afternoon to discuss the sub-Group Reports.

After exchanges, comments and corrections the participating countries validated and adopted the amended NPA manual.

## **6.3. DAY THREE**

Work commenced on the “Marine Pollution Monitoring Manual”. During the afternoon, the participants were hosted by the Minister of Environment and Science, Hon. Christine Churcher at the launching of an audio CD “Sie Sie Wo Mantem” which means “Clean Your Environment” in local parlance, at the Ministry of Environment and Science. The participants returned to continue their examination of the manuals.

## **6.4. DAY FOUR**

Sub-Group sessions on the “Marine Pollution Monitoring Manual” continued till completion. A plenary was convened in the afternoon to discuss the sub-Group Reports.

After discussions and taking into account all comments, contributions and agreed modifications the “Marine Pollution Monitoring Manual” was validated and adopted.

## **6.5. DAY FIVE**

This day was devoted mainly editorial work particularly in respect of the Marine Pollution Monitoring Manual. To the extent possible, suggested modifications were made and SCAN Associates were required to “clean up” the Manual. A small group would be constituted to assist Scan Associates in this task.

## **7. RECOMMENDATIONS**

### **1. Training Manual for the Development of the National Programme of Action (NPA)**

- Participating countries are encouraged to formulate their National Programme of Action (NPA) and sustain the environmental actions that they will put in place.
- Participating countries are to complete the development of their NPAs by mid- 2007.

### **2. Marine Pollution Monitoring Manual**

- A group of scientists should be selected to ensure that all suggestions, comments, omissions and additions recommended are addressed.
- The Manual should be published by end of June 2006 with immediate translation into French.
- The Manual should be distributed to participating countries by the end of July 2006.
- The first meeting to test the Manual should be organized by the end of June 2007
- Capacity should be built with the support of the GCLME and other donors and partners.
- There is the need to know the status of monitoring laboratories in the region.

## **8. CLOSING CEREMONY**

The closing ceremony, held on 14th April at 6:00 pm, was performed by the Minister for Environment and Science, Hon. Christine Churcher and chaired by Mr. William Gana Fomban (Cameroon). In attendance were the Deputy Minister for Environment and Science, Dr. Gheysika Adombire Agambila, the Deputy Director General of the Council for Scientific and Industrial

Research (CSIR), Prof. Alfred Oteng Yeboah and the Executive Director of the Environmental Protection Agency, Mr. Jonathan Allotey.

The Consultant, Prof. Ayite Ajavon, Regional Director, Prof. Chidi Ibe and Minister, Hon. Christine Churcher made informal closing statements, commending the participants for their dedication and contributions to finding solutions to coastal and marine pollution problems, following which the Hon. Minister declared the Workshop closed.

## ANNEX 1: WORKSHOP PROGRAMME

<b>Time</b>	<b>MONDAY, 10</b>	<b>TUESDAY, 11</b>	<b>WEDNESDAY, 12</b>	<b>THURSDAY, 13</b>	<b>FRIDAY, 14</b>
<b>08:30- 10:00</b>	<b>Opening ceremony</b>	<b>Working group Session I</b>	<b>Working group Session II</b>	<b>Working group Session II (cont.)</b>	<b>Plenary : Presentation of WG Reports.</b>
<b>10:00- 10:30</b>	Coffee/Tea break		Coffee/Tea break	Coffee/Tea break	Coffee/Tea break
<b>10:30- 12:30</b>	<b>Administrative Arrangements</b> Election of Chair Election of rapporteurs Presentation of Working documents Objectives of the workshop. Overview of Pollution and Ecosystem Health in the GCLME	<b>Working group Session I (cont.)</b>	<b>Working group Session II (cont.)</b>	<b>Working group Session II (cont.)</b>	<b>Plenary : Presentation of WG Reports</b>  <b>Discussions</b>
<b>12 :30- 13 :30</b>	Lunch break	Lunch break	Lunch break	Lunch break	Lunch break
<b>13 :30- 15 :30</b>	<b>Country presentations</b>	<b>Working group Session I (cont.)</b>	<b>Working group Session II (cont.)</b>	<b>Working group Session II (cont.)</b>	<b>Adoption of summary of WG. Discussions. recommendations</b>
<b>15 :30- 16 :00</b>	Coffee/Tea break	Coffee/Tea break	Coffee/Tea break	Coffee/Tea break	Coffee/Tea break
<b>16 :00- 18 :00</b>	<b>Country presentations Adjournment</b>	<b>Plenary : Presentation of WG Reports Adjournment</b>	<b>Working group Session II (cont.) Adjournment</b>	<b>Working group Session II (cont.) Adjournment</b>	<b>Evaluation of workshop. Closing ceremony</b>

## ANNEX 2: SUMMARY OF COUNTRY PRESENTATIONS

Country	Regular Monitoring	Methods	Equipment	Regular Training	Reports Production	How Useful is Your Monitoring
Sierra Leone	None	Classical determination for E.Coli count Selected heavy Metals BOD, pH, temperature NO <sub>3</sub> SO <sub>4</sub> <sup>2-</sup>	Mostly wet Chemistry Equipment - Colorimeter - Titration - Flame Photometer	None outside routine University Training	Dissertation thesis from Ad hoc Research in University and Research Class	Ad Hoc Monitoring in some cases prevents or arrest emerging pollution crisis Lack of Coordination
Nigeria	Daily Monitoring  Quarterly monitoring  Rainy and dry season	Multi parameters  Spectrometry  Cruise Spectrometry	Horiba (μ-10)  AAS uv/visible Spectrophotometer GC required  Spectrophotometer	No regular training  Regular training required  None	Annual & Technical Reports, journals  Periodicals  None	Information used by private organizations, students, government and entrepreneurs  Lack of Coordination
Liberia	None	Conductivity, BOD, pH, temperature, heavy metals depending on the availability of equipment	Lack of equipment - Photometer - pH meter - Colorimeter	None besides the GCLME Training workshops	Presentations and technical papers prepared by national experts and environmental NGOs.	Information is used by Environmental NGOs, Government and Institutions

Cameroon	None  Some monitoring mainly in research institutes and universities	pH, conductivity, COD, BOD <sub>5</sub>	pH meter AAS	Periodic updates	Yes	For clients; Ministries use data at times to apply the polluter pays principle
Togo	None	None	Not much equipment  Equipment Required	None	Only publications from researchers involved in internships	Not much use is made of data  No consultation between research institutes, government and industries
Democratic Republic of Congo	Lack of sustainable monitoring of the environment  Occasional monitoring	None	None	At the universities for students	Scientific research and investigative reports	Environmental protection measures taken by the authorities  Lack of Coordination
Benin	Only University research on organic pollution measurement in surface water  Nutrients in surface waters  Macro-polluting measurement	Dilution methods, Winkler method, filtration and Gravimetric  Absorption and Spectrophotometry  GC-FID GC-ECD	<ul style="list-style-type: none"> <li>▪ COD Reactor</li> <li>▪ Reflux system</li> <li>▪ BOD Meter &amp; incubator</li> <li>▪ Oxymeter &amp; Winkler kits</li> </ul> <ul style="list-style-type: none"> <li>▪ SHIMADZU 1601 UV</li> <li>▪ HACH DR 2500</li> </ul> HP 5889 SERIES II HP 5889 SERIES II	Training of Students through lectures and Laboratory Works	<ul style="list-style-type: none"> <li>▪ Dissertations</li> <li>▪ Publications</li> </ul>	Setting up Data base at the Agence Beninoise pour l'Environment The results generated are used by the Agency of Environment to set up a program on the Cotonou lagoon for the protection from solid and liquid waste pollution Construction of Latrines along the Cotonou Lagoon

Cote d'Ivoire	RNO-CI National Observatory Network on Water Quality – Coastal, Rivers, Lagoons  CIAPOL  CRO	- Sampling - Water/sediment, living organisms, - Frequency: • Lagoons (monthly) • Rivers (rain)  Parameters Physical (pH, O <sub>2</sub> , Salinity)  Nutrients N-N <sup>0</sup> <sub>2</sub> , N-NO <sub>3</sub> P-PO <sub>4</sub> , N-NH <sub>4</sub>  Micro-pollutants - Pesticides & organic components - Hydrocarbons	- Broken down equipment  - Outmoded equipment over 15 years old  - Chemistry and microbiology laboratory, mobile laboratory, outboard motor	Lack of training programmes for staff, laboratory technicians, apart from training and workshops organized	- Dissertations - Thesis - MPhil - Scientific publications	-Ministry of Environment -Universities -CRO -Research -Technical Ministries - concerned Industries -NGOs Other laboratories
Equatorial Guinea	Medium inspection of the Environment	Mere observations of the manner in which activities are planned	None	None	Report are prepared on some of the inspections carried out	Combating environmental degradation by controlling activities in the area
Congo	None	None	None Proposal for laboratory equipment in collaboration with Japan	None outside GCLME project	National report is prepared by National GCLME Directorate	Visual and Nutrient Monitoring
Guinea	Atmospheric pollution, Waste water, Radioactivity	Filtration, chlorination, colorimeter	Colorimetry, radiometry, AAS, HAACK, Ion Chronometer	Training takes place on a periodic basis	Done	Application in enforcement by the Ministry
Sao Tome and Principe	None	pH, temperature, Conductivity, calcium and Magnesium,	Lack of Equipment Conductimetry, complexometry with EDTA thermometry	None	None	None

Ghana	Air Quality PM <sub>10</sub>	Gravimetric	Hi volume samplers	Annual Refresher courses	Monthly or Annually	For various EIS Government Clients EPA and NGOs
	SO <sub>2</sub>	Titrimetric	SO <sub>2</sub> bubblers, Diffusion tubes	Adhoc Courses on water quality monitoring	Quarterly and Annually	
	O <sub>3</sub>	Titrimetric Hach-field kits	Ogarva Tubes			
	Industrial effluents of Lagoons, Surface Waters (EPA, WRI, GWCL)	Wet chemistry Instrumental field kits GC	AAS required, spectrophotometer, pH meter, BOD,COD kits, 6890 series2, water quality checkers, conductivity meters Turbidity meters	Reports on Research findings sent to the Ministry of Environment and Science		
Adhoc monitoring at the Universities	Nutrients					
Vehicle exhaust emissions	For Petrol and Diesel		Gas and Smoke analyzers			

## ANNEX 3: COUNTRY PRESENTATION FORMAT

### MEETING OF THE REGIONAL WORKING GROUP ON POLLUTION AND ECOSYSTEM HEALTH 10-14 April 2006, Accra, Ghana

The following format is intended to facilitate country presentation. You are requested not to enter details at this point. When possible illustrate the case with pictures or photographs in electronic format.

#### A. Type of pollution

What kind of pollution problem is your country facing? (**mark as appropriate and provide pictures if available**):

- a) Water pollution
- b) Air pollution
- c) Soil pollution
- d) Marine pollution
- e) Chemical pollution
- f) Industrial pollution

#### B. Identification and assessment of problems

Can you identify and/or assess the pollution problems in your country?

(a) Identification of the nature and severity of problems in relation to (**assess by choosing: severe, medium, not relevant**):

- (i) Food security and poverty alleviation;
- (ii) Public health;
- (iii) Coastal and marine resources and ecosystem health, including biological diversity;
- (iv) Economic and social benefits and uses, including cultural values;

(b) Contaminants: (**mark as appropriate**)

- (i) Sewage;
- (ii) Persistent organic pollutants;
- (iii) Radioactive substances;
- (iv) Heavy metals;
- (v) Oils (hydrocarbons);
- (vi) Nutrients;
- (vii) Sediment mobilization;
- (viii) Litter;
- (ix) Carbon dioxide;
- (x) Carbon monoxide;
- (xi) Nitrogen oxides;
- (xii) Particulate matter;
- (xiii) Volatile Organic Compounds;
- (xiv) Ozone;
- (xv) PAH;
- (xvi) Etc.

(c) Physical alteration, including habitat modification and destruction in areas of concern (Please, provide pictures if available);

(d) Sources of degradation:

(i) Point sources (coastal and upstream), such as: (**mark as appropriate and provide pictures if available**)

- a. Waste-water treatment facilities;
- b. Industrial facilities;
- c. Power plants;

- d. Military installations;
- e. Recreational/tourism facilities;
- f. Construction works (e.g., dams, coastal structures, harbour works and urban expansion);
- g. Coastal mining (e.g., sand and gravel);
- h. Research centres;
- i. Aquaculture;
- j. Habitat modification (e.g., dredging, filling of wetlands or clearing of mangrove areas);
- k. Introduction of invasive species;
- l. Biomass burning

(ii) Non-point (diffuse) sources (coastal and upstream), such as: **(mark as appropriate and provide pictures if available)**

- a. Urban run-off;
- b. Agricultural and horticultural run-off;
- c. Forestry run-off;
- d. Mining waste run-off;
- e. Construction run-off;
- f. Landfills and hazardous waste sites;
- g. Erosion as a result of physical modification of coastal features;

(iii) Atmospheric deposition caused by **(mark as appropriate)**:

- a. Transportation (e.g., vehicle emissions);
- b. Power plants and industrial facilities;
- c. Incinerators;
- d. Agricultural operations;

(e) Areas of concern (what areas are affected or vulnerable): **(mark as appropriate and provide pictures if available)**

- (i) Critical habitats, including coral reefs, wetlands, seagrass beds, coastal lagoons and mangrove forests;
- (ii) Habitats of endangered species;
- (iii) Ecosystem components, including spawning areas, nursery areas, feeding grounds and adult areas;
- (iv) Shorelines;
- (v) Coastal watersheds;
- (vi) Estuaries and their drainage basins;
- (vii) Specially protected marine and coastal areas; and
- (viii) Small islands.

### **C. Identification, evaluation and selection of strategies and measures**

What are the Strategies and programmes available in your country related to pollution problems? **(mark as appropriate)**:

(a) Specific measures, including, as appropriate:

(i) Measures to promote sustainable use of coastal and marine resources and to prevent/reduce degradation of the marine environment, such as:

- a. Best available techniques and best environmental practices, including substitution of substances or processes entailing significant adverse effects;
- b. Introduction of clean production practices, including efficient use of energy and water in all economic and social sectors;
- c. Application of best management practices;
- d. Use of appropriate, environmentally sound and efficient technologies;
- e. Product substitution;

(ii) Measures to modify contaminants or other forms of degradation after generation, such as:

- a. Waste recovery;
  - b. Recycling, including effluent reuse;
  - c. Waste treatment;
- (iii) Measures to prevent, reduce or ameliorate degradation of affected areas, such as:
- a. Environmental quality criteria, with biological, physical and/or chemical criteria for measuring progress;
  - b. Land-use planning requirements, including criteria for siting of major facilities;
  - c. Rehabilitation of degraded habitats;
- (b) Requirements and incentives to induce action to comply with measures, such as:
- (i) Economic instruments and incentives, taking into account the "polluter pays" principle and the internalization of environmental costs;
  - (ii) Regulatory measures;
  - (iii) Technical assistance/cooperation, including training of personnel;
  - (iv) Education and public awareness;
- (c) Identification/designation of the institutional arrangement with the authority and resources to carry out management tasks associated with the strategies and programmes, including implementation of compliance provisions;
- (d) Identification of short-term and long-term data-collection and research needs;
- (e) Development of a monitoring and environmental-quality reporting system to review and, if necessary, help adapt the strategies and programmes;
- (f) Identification of sources of finance and mechanisms available to cover the costs of administering and managing the strategies and programmes.

#### **D. Programme support elements**

Please provide information on arrangements in place in your country to deal with pollution (**mark as appropriate**):

- (a) Organizational arrangements to coordinate among sectors and sectoral institutions;
- (b) Legal and enforcement mechanisms (e.g., need for new legislation);
- (c) Financial mechanisms (including innovative approaches to provide continuing and predictable programme funding);
- (d) Means of identifying and pursuing research and monitoring requirements in support of the programme;
- (e) Contingency planning;
- (f) Human resources development and education;
- (g) Public participation and awareness (e.g., based on integrated coastal area management principles).

#### **E. Research and Monitoring**

Has your country research centers and/or institutes of pollution studies (**mark as appropriate and provide pictures if available**):

- a) Available equipment;
- b) Status of scientific equipments;
- c) What pollution parameters are you able to monitor on a sustainable basis?

Has your country stations and/or networks for pollution monitoring (**mark as appropriate and provide pictures if available**):

- a) Air pollution;
- b) Water pollution;
- c) Soil pollution;
- d) Marine pollution;
- e) Chemical pollution;
- f) Industrial pollution.

## ANNEX 4: LIST OF PARTICIPANTS

### COUNTRY

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## **ANNEX 5: KEYNOTE ADDRESS BY MINISTER FOR ENVIRONMENT AND SCIENCE, HON. CHRISTINE CHURCHER**

Mr. Chairman,  
Regional Director, GCLME Project,  
Distinguished Invited Guests,  
Distinguished Workshop Participants,  
Members of the Press,  
Ladies and Gentlemen,

I am impressed with the significant progress being made in the implementation of the strategic action plan of the GCLME Project.

I also want to acknowledge the bond being established among the 16 countries of the GCLME and the opportunities the project provide us in building a very strong network of technocrats, researchers, environmental planners, scientists, and other senior level experts from our Ministries of Environment and Science, Agriculture, Fisheries, Central and Local Governments, the Universities and Research Institutions in the 16 countries to address, through this Regional Workshop, the trans-boundary challenges of the region on “Pollution and Ecosystem Health”.

It is alarming indeed to note the extent of the trans-boundary environmental challenges and significance with respect to the depletion of living resources, uncertainty in ecosystem status (including climate change effects), deterioration of water quality and loss of habitats (including coastal erosion).

According to World Bank surveys in the past decade pertaining to the GCLME, oil producing companies in Nigeria and Sierra Leone discharge an estimated 710 tons of oil yearly into the coastal and marine environment and an additional 2,100 tons originate annually from oil spills. Agriculture, an important activity in all countries in the region, is also causing water quality degradation through the increased use of chemical fertilizers and pesticides, a significant proportion of which constitute agricultural effluents carried to the sea through river outflows. These nutrients coupled with sewage pollution continue to increase levels of eutrophication in coastal waters including lagoons, causing harmful algal blooms.

In almost all the countries, atmospheric pollution is on the ascendancy along the coastal zone. In the big cities for example, emissions from the exhausts of poorly maintained vehicles and the use of outdated industrial processes pose health hazards as well as deterioration of urban air quality. To regain control over our marine resources and ensure their effective management, we do not have a choice but to use the advantages of partnership to build our regional capacity in a united action to fully address our trans-boundary challenges, using appropriate techniques and strategies. It is against this bleak background that the Government of Ghana and in particular my Ministry considers this Workshop of particular significance because we need to arrest the rate of deterioration in the quality of our water bodies as a result of pollution from land and marine-based sources.

For centuries the sea, based on the philosophy that on account of its size could absorb and dilute all waste material to levels that would be harmless to mankind, has been used as a huge “rubbish-

bin” into which all types of waste are indiscriminately dumped. In 1953, 43 people died in Japan from Minimata disease after eating fish that was contaminated with a toxic form of mercury. The source of this mercury was the effluent of a plastic factory, discharged into the Minimata Bay. Subsequently, this led to a great deal of research carried on marine pollution, to serve as the basis for the development of many regulations world-wide that control dumping of waste material into the sea.

Mr. Chairman,

In Ghana, we are yet to fully examine possibilities and effects of marine pollution on the coastal population, nevertheless some programmes have been put in place by the Environmental Protection Agency to monitor effluent discharge and air quality with the aim of promulgating necessary legislation to regulate the levels of pollution discharges and emissions. I believe our GCLME neighbors are pursuing similar policies and programmes.

Mr. Chairman,

Opportunities provided by fora such as this Workshop, therefore are invaluable for us to share and discuss our strengths and weaknesses, to develop sector specific policies and strategies to fully address these challenges and threats in a united front.

The objectives of the Workshop are very laudable indeed. These include:

1. The identification and assessment of land and sea based sources of pollution.
2. The introduction of participants to the effects of pollution in coastal ecosystem, useful approaches to problem definition, and the importance of a regional perspective in the restoration and management of ecosystem health.
3. Determining and addressing training needs in the region for the prevention and control of land and sea based sources of pollution.
4. Identification, strengthening and involving stakeholders in land based pollution issues in the region, including their involvement in monitoring and evaluation as well as development of performance indicators; this particular objective cannot be over emphasized. To reduce pollution and improve ecosystem health requires the efforts of all stakeholders from the grassroots to policy makers.

I am briefed that this Workshop would also constitute a scientific and technical forum to evaluate and approve draft Methodology Manuals on Marine Pollution Monitoring and Development of National Programme of Action for the Prevention of Pollution from Land-based Activities. This would be an achievement and a positive outcome of the Workshop.

It is my belief that at the end of this Workshop a common approach would have been developed to tackle the problems of pollution and the maintenance of ecosystem health in the region. We owe this as a duty to posterity, in the pursuance of the sustainable development paradigm.

I wish you fruitful deliberations and God’s guidance during this Workshop. On my own behalf, and on behalf of my Ministry and the Government of Ghana, I declare this Regional Workshop officially open. Thank you!!!