Intergovernmental Oceanographic Commission

Workshop Report No. 113

IOC Regional Workshop on Marine Debris and Waste Management in the Gulf of Guinea

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UNESCO

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1. INTRODUCTION

Increasing worldwide concern for our common environment is fuelled by several perturbations including acid precipitation resulting from industrialization, ozone layer destruction, gradual global warming, sea level rise, threatening coastal low-lands, multiplicity of human and animal carcinogens, as well as disrupted food chains and mineral cycles. In addition, extinction of plant and animal species occurs on a large scale. Debris in coastal and marine environments has not been of major concern.

Yet, one of the direct consequences of urbanization and adoption of "new" life styles is the generation of solid waste. Some of the visible components of land-generated waste, for example, plastics, rubber products, bottles, cans and other metal containers biodegrade so slowly that they litter almost for ever. Ultimately, a substantial percentage is transported down stream the river systems to the coast. Together with fishing system's discard - wood, glass, reinforced plastics, cork, styrofoam and netting - land waste is transported by and accumulates in the coastal circulation systems as marine debris.

Progressively, marine life is compromised, even endangered. Sea turtles, for example, ingest plastic bags mistaken for jelly fish, resulting in intestinal blockages. Six pack plastic rings often trap or strangle sea birds, among others. Such is the danger posed, and, due to the ocean currents and international high seas traffic, issues associated with marine debris are global.

Marine debris was only recently identified as a pollution problem, and one of the early multinational meetings was convened in Brussels in 1978. The first International Conference on Marine Debris in 1983 highlighted the problems.

In May 1994 the Third International Conference on Marine Debris brought to the attention the complexity of the debris related problems and several management options were presented. Information on the amount of debris was presented from some regions. However, in many cases sufficient monitoring is lacking.

Public education and awareness programmed have started. These coastal programmed have become enduring substantiations that oceans, rivers, streams and lakes should be accommodated within the global effort to preserve nature, wildlife and humanity. In fact, the data collected from clean-ups are baseline for legislation, varying from country to country, prohibiting and penalizing ocean dumping and abuse.

Despite the fact that the extent and severity of the problems related to marine debris and the need for action on mobilizing management solutions is widely acknowledged by scientists in the Gulf of Guinea region, major challenges still lie ahead with regard to control and abatement of the complex pollution problem related to marine debris. The challenge is the magnitude of the developing and implementing phase connected to the MARPOL convention. This issue calls for an increase of existing co-operation among regional scientists, decision makers and the general public and has to be well co-ordinated by a competent body possessing capabilities to carry out a multidisciplinary and international programme. The purpose of this Marine Debris Waste Management Workshop is to specify the main activities needed to start reducing, and eventually, eliminate marine debris in this area.

Following the overall objectives of the Intergovernmental Oceanographic Commission (IOC) to develop, promote and facilitate international oceanographic and marine research to improve our understanding of critical global and regional issues related to ocean and coastal areas, to ensure effective planning and co-ordination of marine science and technology and provide international leadership for education and training programmed on the ocean and coastal matters, the marine debris issue is of one concern.

IOC'S goal is thus to provide the above services, among other, to its Member States. IOC then seeks for co-operation and collaboration to ensure that the funds are most efficiently used and to share expertise in the complex programmed, such as the marine debris/waste management.

To this end IOC/UNESCO and NIOMR co-sponsored this three day regional marine debris/waste management workshop in Lagos, Nigeria for the Gulf of Guinea countries (Benin, Cameroon, Cote d'Ivoire, Ghana and Nigeria) .

This meeting is to define actions to be taken to reduce the amount of debris through scientific investigation, outreach campaigns and other activities.

The objectives of the recommendations are to respond adequately to the actions identified in Agenda 21, chapter 17 of UNCED, with programmed related to marine debris, such as:

(i) Integrated management and sustainable development of coastal and marine areas, including exclusive economic zones;

(ii) marine environmental protection;

(iii) strengthening international, including regional co-operation and co-ordination.

Our aim for the future is to implement as much as possible the specified primary recommendations and create a co-ordinating mechanism between governments, international organizations, NGOs and the industry in this region.

2. OPENING

The opening ceremony took place at the Nigerian Institute of Oceanography and Marine Research (NIOMR) conference room, in Victoria Island, Lagos at 10.00 a.m. on 14 December 1994.

The meeting was opened by Dr T.O. Ajayi, Deputy Director (Fisheries) of NIOMR. He made reference to his participation at the Third International Marine Debris Conference held in Miami (USA) in May 1994. He said that he is happy that IOC has taken the initiative to address this very complex issue in the Gulf of Guinea.

Dr J.G. Tobor, Director of NIOMR welcomed the participants and clearly signaled that he hopes that this workshop will be successful and come up with plans and strategies for implementation and reducing marine debris and for developing waste management techniques in the Gulf of Guinea. The opening statement by Dr Tobor is given in Annex III.

The IOC Technical Secretary, Mr Stefan Andersson welcomed the participants on behalf of the IOC Secretary, Dr Gunnar Kullenberg, and and informed them about IOC objectives and programmed. On behalf of IOC, he expressed his sincere gratitude to NIOMR for hosting the meeting and providing excellent facilities. The opening ceremony was closely monitored by the Nigerian press and television and who reported the opening of the Workshop in the national television news as a way of sensitizing the public and creating public awareness to the marine debris problem. The Workshop was chaired by Dr T.O. Ajayi.

3. ADMINISTRATIVE ARRANGEMENTS

3.1 ADOPTION OF THE AGENDA

The meeting adopted the agenda as given in Annex I

3.2 DESIGNATION OF RAPPORTEUR

The meeting accepted the proposal by Dr Ajayi to designate Mrs Regina Folorunsho (Nigeria) and Dr Jean Folak as rapporteurs for the meeting.

3.3 CONDUCT OF THE SESSION

The Technical Secretary reviewed the arrangements of the meeting and explained to the participants that after introductory sessions and country presentations the meeting is to break up into working groups in order to finalize the recommendations.

The recommendations adopted by the meeting are given as Annex II.

4. PRESENTATION OF IOC REGIONAL ACTIVITIES RELATED TO MARINE DEBRIS - THE DEVELOPMENT

Mr S. Andersson, introduced this agenda item referring to IOC Technical Series No. 41 "Marine Debris/Solid Waste Management Action Plan for the Wider Caribbean". He outlined that Marine Debris, ranging from plastics, metal cans, bottles, tyres to fishing lines and nets are fouling the beaches, polluting the environment, killing wildlife and pose a health and safety hazard to coastal residents and tourists.

Marine Debris has become a cause of.world wide concern. Efforts to tackle the problem will have to deal with socio-cultural and economic variables, which, combined with financial policy, public awareness and scientific monitoring, will play an important role.

As an example, regional experts from the Caribbean recognized marine debris as an environmental problem of primary concern. Such concern was ratified by government representatives at the Third Session of the Sub-Commission for the Caribbean and Adjacent Regions in 1989.

As direct response to such concern, the IOC, through co-ordination by IOCARIBE, commissioned the implementation of the Marine Debris Pilot Monitoring Project for the Wider Caribbean. The results from this exercises were brought to the attention of the Second Caribbean Marine Debris Workshop. At this Workshop, representatives from UNEP, IMO, World Bank, governmental institutions and private industry together with Non-governmental organization were present.

The meeting focussed on producing a realistic action plan where IOC through IOCARIBE will be the overall responsible co-ordinating organization, but the success of the plan was dependent to a great extent on the collaboration of all parties concerned.

From the monitoring exercises we could ascertain the severity of the level of pollution by marine debris. The evidence compiled did not support the perception that off-shore activities constitute the main source of debris, and we could conclude that the flow of debris from land to sea is more significant in the Caribbean Region.

The sources of debris are extremely diverse and so should thus be the solutions to tackle the problem.

The Marine Debris/Waste Management Action Plan for the Wider Caribbean is thus addressing issues ranging from continued monitoring exercises to assess the progress, to outreach campaigns, cost-benefit analysis, and feasibility studies of waste management.

This plan has been widely acknowledged and more than half of the actions are being implemented. The Marine Debris programme has become an outstanding example of co-operation between UN organizations as well as other governmental/non-governmental organizations, and the industry involved.

5. PRESENTATION OF MARINE DEBRIS MONITORING MANUAL

The Technical Secretary introduced this agenda item by referring to the marine debris survey manual, which was the results of discussions held at the Sixth Session of the Intergovernmental Oceanographic Commission's working committee for the Global Investigation of Pollution in the Marine Environment (25 September to 1 October 1986). The Marine Mammal Commission of USA recommended that the National Marine Fisheries Service Entanglement Research programme to take on the effort of producing a procedure manual and drafted the original scope of work for this survey plan.

The participants at the present Workshop expressed interest in conducting a pilot monitoring programme of beach debris (see recommendations) .

Summary of objectives and purpose, field measurement, pilot studies and field sampling design as well as analytical procedures were presented.

6. REVIEW AND PRESENTATION OF THE MARINE DEBRIS/WASTE MANAGEMENT ACTIVITIES PRESENTLY UNDERTAKEN IN THE FIVE COUNTRIES

Each country representative was invited to make a presentation of their country's involvement in the area of marine debris/waste management, including scientific investigations, actions undertaken and if possible bringing forward the legal framework.

The presentations hereby follow in chronological order.

BENIN

(I) PHYSICAL SETTING OF THE BENIN COASTAL ZONE

The Republic of Benin is a West African country which lies between the sixth and thirteenth parallels of North Hemisphere. It shares common boundary with Nigeria at the East, Togo at the West, Niger and Burkina Faso at the North and Gulf of Guinea at the South.

Benin has about 140 kilometers of sea coastline. The principal Rivers are Oueme, Mono, Couffo and Nokoue lake which joins sea by Cotonou Lagoon.

(II) THE BENIN POPULATION AND ITS GEOGRAPHIC REPARTITION

Benin has about 5 million inhabitants (according to World Bank 1991) and 60% of this population live in rural zones. The other 40% live in 5000 inhabitants communities or big towns. Urban population is concentrated in the two southern departments (Atlantic and Oueme). About 45% of Benin population now lives within 50km of the coast. This number is increasing rapidly due to a combination of population growth, migration and urbanization.

The unrestrained pursuit of multiple activities in coastal areas can lead to competition for finite resources, environmental degradation and often environmental and social conflict.

(III) SOLID WASTES MANAGEMENT IN BENIN

National production of solid wastes in 1991 were about 230000 tons and 60% of these for Cotonou town.

In rural areas, garbage are evacuated out from the concession and burned sometimes.

In urban zones, particularly in Cotonou, wastes are used to fill in low or marshy areas.

In towns, rate of waste collection is under 30%. Most of Cotonou solid wastes are composed of organic matters (animal and vegetable) and sand. We can find also other material like paper, carton, rubber, wood, glasses, bottle, synthetic material, metal etc.

GARBAGE PRODUCTION IN PRINCIPAL TOWNS OF BENIN

TOWNS	POPULATION	RATE OF POPULATION GROWTH (%)	YEARLY GARBAGE PRODUCTION (TONS)	COLLECTED PROPORTION (%)
COTONOU	787000	8,3	143000	20
PORTONOVO	205000	4,1	32700	15
PARAKOU	149000	8,5	24800	30
ABOMEY-BOHI CON	112000	4,8	17000	0
LOKOSSA	31000	8,3	4900	0
NATITINGOU	26000	6,5	4050	0

Most of industrial waste are liquid-or muddy. Cotonou has the biggest industrial production with about 80.000m^3 yearly production.

LIST OF INDUSTRIAL ESTABLISHMENTS AND TYPES OF PRODUCED WASTES

COMMERCIAL OR INDUSTRIAL ESTABLISHMENT	TYPES OF PRODUCED WASTES
1. ABATTOIR DE COTONOU (Slaughter House)	Blood, animal entrails, excrements, used waters.
2. SONICOG (National industry for cotton, grounds nuts and production)	Alkaline used waters, residual oils, other materials
3. SOGEMA (Market management industry)	Vegetable wastes, packing used waters.
4. LA BENINOISE (Benin drink industry)	Used waters, mud, bottle and glass debris.
5. PORT AUTONOME DE COTONOU (National Port Authority)	Packing, other types of waste.
6. HOSPITALS	Medical wastes, organic waste, syringe debris etc.
7. HOTELS	Organic waste.
8. TEXTILE INDUSTRY	Alkaline used and coloured waters.

(VI) COASTAL WASTE DISCHARGES SITES

Most of the above-mentioned produced wastes are thrown back in the Cotonou Lagoon or directly in the Golf of Benin sea (cf MAP).

(v) LEGISLATION FOR COASTAL MANAGEMENT IN REPUBLIC OF BENIN

Republic of Benin has no coast-specific legislation but most of coastal management is addressed through environmental protection laws or water resources management laws:

Some of the national legislation are:

Decree No. 86-576 of 15 December 1986 on Coastal Management.

Law No. 87-015 of 21 September 1987 on Code of Public Hygiene.

Other laws about Economic Exclusive Zone and Fisheries Management.

Decision 0014/MET/DGM/DEP of 5 May 1987 on organization and working Coastal Fund.

CAMEROON

(I) INTRODUCTION

Cameroon is located in the Gulf of Guinea. It has a coastline of about 360km. The climate of the coastal region is the equatorial type with regular alternation of the dry and rainy season. The sea water circulation is slow and this results in high rate of sedimentation. Living resources are mangroves, marine aquatic fauna which is made up mainly of fish, crustacea, molluscs and others.

More than 70% of marine living resources exploited in Cameroon are from the continental shelf and the highest concentration of human settlement is found in the coastal agglomeration. As such, the exploitation, utilization and management of the coastal zones are an integral part of the development in Cameroon. As such coastal zone has become very delicate to manage. This management has multiple implications with regards to human activities involved: trade, fishing, agriculture, industrialization, maritime traffic, urbanization, tourism, public health etc. which are often the source of conflicts and interests leading to the degradation of the natural environment.

It is in the light of this that the Ministry of Environment and Forestry was created in 1992. But since 1980, the Research Centre for Fisheries and Oceanography carried out a research programme on marine pollution and some sources of pollutants have been identified. This country report related the present state of marine and coastal environment in Cameroon.

(II) SOURCE OF POLLUTION

Cameroon marine pollution are generated mainly by human activities like agriculture, industries, fishing, maritime traffic. Different types of pollutants were found and included insecticides, fertilizers, heavy metals, marine debris like tar balls, etc.. The impact of these pollutants on marine and coastal ecosystems have been described by Folack (1993) and the quantities of pollutants thrown on the coastal and marine zone by industries was stated by UNEP (1982).

(III) ANALYSIS OF DATA ON SOME MARINE OR COASTAL POLLUTANTS

Studies on pollution by heavy metals, tar balls have been carried out at the Fisheries and Oceanographic Research Centre, Limbe. The metals analyzed were mercury, zinc, copper, cadmium, iron and manganese. Tar balls were collected in two different types of beaches: touristic beaches (Beta, Essongo, Londji), fishing beaches (Debundscha, Souelaba point) and on the estuaries (Sanaga, Lokoundje).

(IV) CONCLUSION

The impact of human activity on marine and coastal ecosystems in Cameroon is from industry, agriculture, fishing etc. . These activities bring high population concentration in and around coastal cities like Douala, Limbe, Edea, Kribi causing other problems like the management and treatment of urban wastes. In the light of this, the government have set up an environmental programme to monitor the pollution in the marine and coastal area. The programme will identify the source and the type of pollution, their quantification, the inventory of marine debris; the evaluation of the impacts of pollution and marine debris on the marine and coastal ecosystems, the implication of local population on the management of marine and coastal resources. The education of local population on the importance of management and conservation of the coastal and marine resources legislation and protection measures will be taken for a sustainable development of the Cameroon coastal and marine zone.

COTE D'IVOIRE

The marine debris are not assessed and monitored as such for the purpose of developing scientific programmed in this domain. The domestic and industrial wastes were under a very well controlled management plan in the big coastal cities like Abidjan.

To show some figures, the domestic wastes production in Abidjan is estimated at 2300 tons/day which about 1700 tons/day are collected for the municipal discharge. There is almost a balance of 600 tons which are not collected - among these domestic wastes, plastics are very important, followed by the organic matters, bottles and batteries. The expected consequences on the environment are to find the plastics and other miscellaneous beaches destinated wastes. To mitigate these undesirable effects the Ministry of Environment and Tourism has initiated some concrete actions in association with some NGOS like ANCAV based in the communal city of Port Bouet and with the International American School.

The main objectives to achieve were to cleanup the beaches - During this operation, there were no statistics organized. All these solid wastes collected were destroyed when possible or brought to the communal discharge. The other wastes are paper-made and can be recycled.

The 'main preoccupation is relevant to the plastics wastes which are widespread on the streets of the Abidjan city. It can be therefore pointed out that the plastic wastes control is of a deep concern in environment parlance. There was intention to develop concrete action with Senegal because the plastic wastes pose environmental problems in Dakar also.

Therefore the Gulf of Guinea Marine Debris Monitoring Programme (GG/MARDEB Programme) is of high interest to Cote d'Ivoire where the industrial tourism being launched needs to be based on clean beaches. Furthermore, the lagoons are receptacle of various wastes and need to be clean to promote sanitary conditions for any use.

Some other "wastes" are also seaweeds which appear periodically during the last raining season of the year from September to November.

The consequence of this organic matter accumulation is the eutrophication of the lagoon.

To conclude the GG/MARDEB Programme can provide ways to solve problems raised by the wastes accumulation on the beaches, in the sea and lagoon.

Therefore the Ministry of Environment and Tourism in co-operation with other national organizations concerned or competent can initiate the marine wastes monitoring programme.

NIGERIA

The Nigerian Marine environment consist of low lying coastal plains with sandy and some cases muddy beaches, lagoons, estuaries, shallow continental shelf. The Nigerian marine environment is blessed with a wide variety of natural resources including several species of fishery resources, oil and gas, non fuel minerals, mangroves and wet lands as well a wide variety of flora and fauna. About 20% of the national population live within the coastal zone while industrial activities within the coastal zone constitute about 50% of the national industrial activities.

Many of the coastal activities and even those in the hinterland generate wastes which eventually find their way to the coastal zone. Many of the wastes include industrial wastes, solid waste\debris by tourists on the beaches, domestic waste, and raw sewers. These wastes and especially the solid ones find their way to the beaches fronting the ocean, the beaches around the lagoons and even in the water bodies.

Waste management in Nigeria is basically the responsibility of state waste management boards. These boards are responsible for the collection and disposal of wastes. The Federal Environmental Protection Agency (FEPA) which was established under Decree 58 of 30 December 1988, is the main arm of the Federal Government saddled with ensuring the sustainability of the Nigerian environment. Management policies of the coastal zone including legislation for disposal of wastes in the coastal zone are within the jurisdiction of the agency. Though some refuse bins are provided behind important beaches like the Victoria beach, most beaches are littered by all sorts of debris. In most cases, bins are not even collected and disposed in time by the refuse collecting agency. Much of the cleaning and disposal of beach debris are usually done by local owners of tourist facilities on the beach since there are no coordinated system of beach debris collection and disposal.

For the first time ever in Nigeria, a beach clean-up was organized in Lagos on September 24 1994. The beach cleanup was organized at the instance of the United States of America Centre for Marine Conservation in connection of the International coast week and the international beach cleanup day. The Centre for Marine Conservation provided the data sheets and the poster used for the beach up. The objective of the beach clean up was to sensitize the government and beach users on the need to keep the beaches clean. The 1994 beach clean up attracted well over 100 volunteers. Volunteers picked debris on the beach along established profiles within about 2.5km stretch of the Victoria beach. A total of 10.872 pieces of debris weighing 531.lkg were collected from the beach during the beach. Below is the breakdown of the debris collected from the beach. The results show that plastics constituted 87% of the debris collected from the beach. This is a pointer to the types and sources of debris littering the beaches and subsequently the marine environment.

Table 1. Summary of debris collected from the beach

TYPE OF DEBRIS	NUMBER OF DEBRIS
Plastic	3,974
Foamed Plastic	1,129
Glass	730
Rubber	785
Metal	1,393
Paper	1,755
Wood	785
Cloth	335
Earthenware Pots	13
TOTAL NUMBER	10,872
TOTAL WEIGHT	531.1 kg

The beach clean up results show that there a is need to initiate a marine debris monitoring project to collect data on the types and sources of debris littering the beaches. Such data could form the yardsticks for the formulation of effective management of debris in the marine environment.

Despite the efforts of the government in the area of wastes management in the coastal areas, much still has to be done to achieve a satisfactory level of integration of waste management considerations into our national development process.

GHANA

(I) INTRODUCTION

The coastal area of Ghana is subject to pollution from domestic and industrial activities largely as a result of incompatible landuse, inadequate waste management facilities and ineffective legislation.

There are areas where marine debris pollution is so severe that land and aquatic ecosystems are threatened owing to technological and industrial activities. This is due to the concentration of about 30% of Ghana's manufacturing industries within the Greater Accra Metropolitan Area.

The major pollution problem caused by marine debris however arises from domestic activities. The main factors are inadequate provision of basic sanitary facilities especially in the economically depressed, high density areas; accelerated and unplanned urbanization; and the non-enforcement of pollution control measures leading to uncontrolled discharges of untreated wastes. Thus , sewage and garbage are either directly deposited on lagoon banks and beaches or reach the coastal zone via surface runoff, drains or culverts.

Both domestic and industrial pollutants contribute to increased biochemical oxygen demand and concentration of toxic chemicals in the coastal waters. The lagoons, which have relatively poor water exchange, are the most affected. The most polluted catchments are the Accra Lagoons which are biologically non productive from a fish production view point. Although other lagoons may be classified as only slightly polluted at the moment, the expected large increases in population levels, urbanization and industrial activity will significantly increase the. threats of pollution by marine debris in all sea-flowing waters. The current state of most sea flowing waters (lagoons) wheremost industrial and domestic debris are discharged, is one of heavy siltation and pollution. The siltation is mainly of solid waste origin such as garbage. The pollution is mostly from affluent from factories, oil spills from motors used for fishing and waste water from the drainage network of the cities. This has considerably reduced the depth of the affected lagoons to the extent that fishing activities have been halted. The cleansing

effect of the tidal action of the sea has been drastically reduced by the degree of siltation and pollution in the lagoons. Thus these lagoons can sometimes be described as bodies of foul water.

If there is no change in current infrastructural sanitary and industry controls, by 2010, and in many cases much earlier, most coastal areas will have become biologically inactive with sterile, unusable areas around them due to lack of marine debris pollution control.

(II) LEGISLATION

In addition to the above issues, the environmental problems in Ghana are also related to the lack of policy planning and to the non-enforcement of existing legislation on discharges of domestic and industrial wastes. There are at least 26 pieces of legislation relating directly or indirectly to the coastal zone. These cover, among others, pollution control, environmental assessment, tourism and development and general conservation.

The lack of co-ordination has however led to sectoral interests and non-implementation of decisions. The Environmental Protection Council (EPC) which was established as the central co-ordinating agency has not been very successful in curbing pollution generally. Pollution control measures used without the legislation necessary to penalize offenders have invariably proved ineffective.

(III) RECOMMENDATIONS

A number of strategies can be implemented to reduce the predicted increases in marine debris pollution in Ghana. These are related to sanitation and waste water management, regulation of industry location, environmental impact assessment, pollution control and energy conservation.

Of prime importance is the need to rehabilitate the existing central sewerage outfall and maximize connections to this system. The operating reliability of the many package sewerage treatment plants in the Metropolis should be improved and such measures should apply to other areas in the country to improve global waste management.

For existing industries, it is necessary to consider pollution control regulations. The central theme here is that the industries must become responsible for their own polluting actions. This will involve the definition of pollution control standards and monitoring of pollution by individual polluters through industry - prepared environmental auditing. For the system to work effectively it is necessary to enact pollution control legislation for non-compliance with stipulated standards.

Sediment control is of major importance in controlling marine debris pollution. Sediment build-up significantly reduces the capacity of the drainage systems and is primarily deposited in the coastal waters. An example is the Korle Lagoons which, although, has been dredged on two occasions within the last 30 years currently requires dredging again. The strategy is for sediment control centres to control at the source by installing sediment traps on a catchment basis. Works are also required to restructure the lagoon outlets to improve exchange and reduce local flooding.

As already advocated, a community based approach in conjunction with formal legislation provides the best chances to implement change in the coastal waters. This is recommended largely because of the demonstrated failure of legislative controls to consistently effect change and also to incorporate traditional values into management practices.

Often a change in community attitudes is required to implement a management strategy and education is therefore linked to implementation as part of the solutions. There is therefore a need to increase the effectiveness of existing legislation through community based education programmed. Priorities for new regulations should be in the area of environmental assessment, pollution control, coastal settling, tourism quality assurance, protected areas, shoreline ownership and monitoring. Co-ordination of legislation should also be formulated given the large number of existing disperse laws and regulations.

Environmental education is the tool that can used to change community attitudes and gain support for the actions needed to improve the environmental management of our coastline. Existing community attitudes that need to be reinforced include the importance and relevance of traditional values in control of activities in coastal lagoon's and recycling of such wastes as glass and plastics. Beach clean-up campaigns have proved to be very successful in making the public aware of dangers of marine pollution as a result of beach debris and such campaigns must be supported and propagated all over the coastline and even landlocked areas.

A number of media including radio and television programmed, newspaper articles and NGOS can be used. International experience shows that success is highest when focused on children's education.

Finally, without monitoring and evaluation, the proposed strategies will become inflexible and will be relevant for only a few years. A monitoring and evaluation programme is thus central to implementation. The main components will be the collection, analysis and retrieval of relevant data that measure marine debris pollution over time and the ability to review these strategies and their efficiencies accordingly.

7. INTRODUCTION TO DEVELOPING ORIGINAL MARINE DEBRIS ACTION PLAN INCLUDING MARINE DEBRIS INTERCOMPARISON STUDIES

This agenda item was introduced by the technical secretary making reference to the development of Marine Debris/Waste Management action plan in the Wider Caribbean. The participants endorsed the proposals of and clearly stated the need for cooperation and collaboration between the countries in the region acknowledging the interdependence in the area of marine debris.

Discussions were held on how to approach this issue both geographically and technically. Several questions were raised about the MARPOL treaty in the area and the participants together with the IOC Secretariat are to find out details from the IMO, as well as from national port authorities.

The participants recognized the need for starting monitoring the marine debris on selected beaches so as to compile scientific data for use in other actions to combat the problem.

A rather extensive discussion was held on what actions are to be prioritized in this region. However, after finalizing the intercomparison study a need for an integrated approach to solving the marine debris problem is necessary. This includes multidisciplinary actions ranging from, Cost-benefit analysis, Life Span studies, Quantification of waste generated at different sites, circulation studies etc.

Subsequently the meeting broke up into working groups to articulate the recommendations into action plan.

8. COMPILATION AND REVIEW OF WORKING GROUPS RESULTS AND RECOMMENDATIONS

The recommendations of the working groups were amended as necessary and subsequently ratified.

The recommendations as adopted by the meeting are included as Annex II - Action Plan.

9. ADOPTION OF REPORT INCLUDING RECOMMENDATIONS

The report was adopted with a request urging competent authorities to actively solicit funding for the recommended action plan.

10. CLOSURE

During the closing ceremony participants expressed sincere appreciation to IOC for its foresight, and promised to sensitize their administration to Marine Debris Issues while awaiting further directives on the action plan.

ANNEX I

AGENDA

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2. OPENING

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   (II) CAMEROON

   (III) COTE D'IVOIRE

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7. INTRODUCTION TO DEVELOPING ORIGINAL MARINE DEBRIS ACTION PLAN INCLUDING MARINE DEBRIS INTERCOMPARISON STUDIES

8. COMPILATION AND REVIEW OF WORKING GROUPS RESULTS AND RECOMMENDATIONS

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ANNEX II

RECOMMENDATIONS - ACTION PLAN

ACTION 1 - INITIATION OF A REGIONAL MARINE DEBRIS MONITORING PROJECT IN THE GULF OF GUINEA

INTRODUCTION

The first workshop focussing Marine Debris in the Gulf of Guinea involved five countries; the Republic of Benin, Cameroon, Cote d'Ivoire, Ghana and Nigeria. After reviewing the country presentations, the meeting concluded that there was lack of data on marine debri, whereas information on levels of litter discharged directly or carried by tidal currents into the Gulf of Guinea would enhance the perception of the problems. Consequently, the meeting suggested the initiation of a marine debris monitoring project to collect baseline data.

The meeting also resolved that standardized methodologies should be used to facilitate data collection and analyses and comparison of results.

MAIN OBJECTIVES

Investigate the types and sources of marine debris in the Gulf of Guinea, concentrating on the sea beaches and back lagoons: formulate national and regional policies and articulate strategies.

IMPLEMENTATION PROCEDURES

Form national project groups and identify national focal institutions;

Identify a regional focal and co-ordinating institution;

Select monitoring sites;

Design and standardize sampling procedures;

Collect data on stranded marine debris throughout the Gulf of Guinea;

Determine level of marine debris entering the region using Neuston nets, and direct ship board observations;

compile and analyse data and produce a report on the subject addressing regional and national policy issues and debris management strategies.

LEAD IMPLEMENTING ORGANIZATION: IOC (IOCEA) & NIOMR
IMPLEMENTATION TIME-FRAME: JULY 1995 - OCTOBER 1996
COST : US$ 10,000

ACTION 2 - INTEGRATED AND ECOSYSTEM COMPATIBLE MARINE DEBRIS MANAGEMENT DEMONSTRATION PROJECT

INTRODUCTION

Marine debris management could be a by-product of the interaction of natural and anthropogenic systems. This could incorporate the re-orientation of education to foster supportive attitudes and waste minimization consciousness. And community based enterprises, technological development, outreach programmed, coastal and upland community communications, by-laws enforcement and the co-operation of relevant public and private organizations could all be integrated.

OBJECTIVES

To plan and implement demonstration projects reflecting ecological, economic and institutional variabilities in the Gulf of Guinea, while integrating eduction, scientific, technological and economic development to achieve reduction of marine debris in important conservation areas.

IMPLEMENTATION PROCEDURE

i) Select coastal sites in the Gulf of Guinea appropriate for integrating coastal development programmed;

ii) Identify related local agencies capable of implementing pilot projects:

iii) Prepare detailed plans and procure funds for community based waste management conscious pilot projects integrating conservation, tourism and economic development with local participation;

iv) Implement plans and progressively fine-tune as models for widespread adoption.

LEAD IMPLEMENTING ORGANIZATION: IOC-SAREC, UNEP
IMPLEMENTATION TIME-FRAME: 1996-1998
COST : Us$ 5,000

ACTION 3 - PARTICIPATION OF COUNTRIES AND RELEVANT AGENCIES IN THE GULF OF GUINEA MARINE DEBRIS MANAGEMENT PROGRAMME

INTRODUCTION

For an effective action plan on Marine Debris Monitoring and Management, participation of all countries in the region is imperative and would be decidedly profitable especially as movement of pollutants and debris respects no boundaries.

OBJECTIVES

Develop strategy to promote active participation of countries, relevant groups and institutions in the Gulf of Guinea.

IMPLEMENTING PROCEDURE

i) Identify and select key individuals, groups, institutions and agencies and national focal points as contact points within the region;

ii) Forward relevant information and materials periodically to these contacts;

iii) Solicit and receive relevant local information through the contacts;

iv) Invite and sponsor selected contacts to the next workshop.

LEAD IMPLEMENTING ORGANIZATION: IOC, UNEP , PARTICIPATING INSTITUTIONS,
IMPLEMENTATION TIME-FRAME: 1996-1998

ACTION 4 - MARINE DEBRIS SOCIO-ECONOMIC IMPACT STUDIES

INTRODUCTION

Marine debris affects the communities and individuals dependent on the sea for sustenance in the Gulf of Guinea. Marine debris is negative to tourism and beach clean-up costs appear exorbitant. In addition, vessel and gear damage traceable to debris seems to be considerable, but the cumulative financial loss is not precisely known. Clearly, pilot socio-economic assessments to quantify, in monetary terms the total impact of marine debris on the coastal areas are mandatory.

Such studies would guide policy makers, as well as waste management, tourism and industry planners.

OBJECTIVES

Conduct pilot SOCIO-economic studies in order to assess the economic impact of marine debris on coastal areas entrepreneurship.

IMPLEMENTATION PROCEDURES

i) Inventory socio-economic studies in the Gulf of Guinea that address marine debris producers directly or indirectly.

ii) Evaluate the present state of knowledge of the socio-economic impact of marine debris in the Gulf of Guinea.

iii) Conduct in selected locations in each country, a detailed and comprehensive marine debris socio-economic impact study with considerations given to:

a) loss of fishing or operations items arising from marine debris disturbance;

b) loss of tourism and related revenue due to debris-covered beaches.

c) sustainable maintenance of clean beaches and costs to private owners, cities and regional authorities.

LEAD IMPLEMENTING ORGANIZATION: IOC (IOCEA)
IMPLEMENTATION TIME-FRAME: 1996-1997
COST : US$ 15,000

ACTION 5 - PROMOTION OF EFFECTIVE WASTE MANAGEMENT PRACTICSES THROUGH EDUCATION

INTRODUCTION

Lack of awareness of good practices has led to improper disposal of solid wastes, and associated problems. Negative impacts include non-aesthetic beaches, coastal biodegradation and marine flora and fauna impoverishment. Without doubt, outreach campaigns and educational programmed to inform populations about marine debris, encourage proper waste management practices and discourage dumping are means of tackling the marine debris problems.

OBJECTIVE

Initiate and develop strategies to improve awareness of marine debris and waste management.

IMPLEMENTATION PROCEDURES

i) Develop and produce educational campaign materials including posters on waste disposal, and marine debris reduction and recycling.

ii) Distribute and display such materials widely in the region focussing especially coastal towns, and the beaches.

LEAD IMPLEMENTING ORGANIZATION: Centre for Marine Conservation (CMC), IOCEA
IMPLEMENTING TIME-F-: 1996-1998
COST : US$ 30,000

ACTION 6 - CREATION OF AN EFFECTIVE MARINE DEBRIS COMMUNICATION NETWORK AND COMPREHENSIVE DATABASE IN CO-OPERATION WITH INTERGOVERNMENTAL ORGANIZATIONS, NGOS AND THE INDUSTRY

INTRODUCTION

Contemporary technology permits low-cost instant communication of information, facilitating networking.

Cost-efficient dissemination of real time data, instantaneously, would sustain the momentum and facilitate the development and implementation of region-wide marine debris monitoring and management plans.

IMPLEMENTATION PROCEDURES

i) Solicit for and initiate the collection of marine debris related information obtained by institutions, programmer projects and other sub-regional mechanisms;

ii) Research the modus of, and effect periodic up-dating;

iii) Establish Internet or an E-mail bulletin board or compatible systems;

iv) Design the format for publishing and distributing periodic marine debris information bulletins and

v) Create national solid waste databases and link with INTERNET for access.

LEAD IMPLEMENTING ORGANIZATION: IOC (IOCEA), NIOMR
IMPLEMENTING TIME-FRAME: 1996-1999
COST : US$ 10,000/YEAR

ACTION 7 - UTILIZATION OF SHIPBOARD CAPACITIES FOR MARINE DEBRIS MONITORING

INTRODUCTION

Monitoring and control of Marine Debris in the Gulf of Guinea demand not only the co-operation of the countries for effectiveness, but also the mobilization of some of the relevant human and material resources for cost efficiency. In this regard, ship cruising in the Gulf of Guinea could contribute substantially to Marine Debris monitoring in the region.

OBJECTIVE

To use vessels sailing in the Gulf of Guinea as ships of opportunity in the monitoring of marine debris.

IMPLEMENTAT ION PROCEDURES

i) Promote the involvement of merchant, naval and fishing vessels in the monitoring and management of marine debris;

ii) Draft and justify new and strengthen existing legislation addressing marine debris issues.

LEAD IMPLEMENTING ORGANIZATION: Participating Institutions in the monitoring programme of Action 1
IMPLEMENTING TIME-FRAME: 1996-1998

ACTION 8 - INITIATE COASTAL CLEAN-UP CAMPAIGN IN THE GULF OF GUINEA

INTRODUCTION

Although a few countries in the region have undertaken clean-up campaigns, they have been restricted largely to particular wastes and have been irregular. It is clear that a well co-ordinated and comprehensive marine debris clean-up programme which is undoubtedly desirable, is lacking in the Gulf of Guinea. Considering its potential impacts on the environment it is now necessary to focus on marine debris, and evolve clean-up activities involving all coastal and land locked countries in the region in co-operation with non-governmental organizations (NGOS) .

OBJECTIVES

i) Initiate public awareness of the marine debris problem in the Gulf of Guinea;

ii) Organize and utilize volunteers on beach clean-up campaigns and maintain records of the types and quantities of marine litter items;

IMPLEMENTATION PROCEDURE

i) Identify clean-up groups in various countries in the Gulf of Guinea;

ii) Organize and provide technical guidance to the groups;

iii) Design and distribute bilingual (English and French) data cards for collection and analysis;

iv) Collate and analyse data on clean-ups and write a detailed reports;

v) Communicate results of clean-up campaigns to local, regional and international agencies to facilitate waste management.

LEAD IMPLEMENTING ORGANIZATION: IOC, CMC and other regional NGOS
IMPLEMENTING TIME-FRAME: 1996-1999
COST : US$ 15,000/YEAR

ACTION 9 - SECOND MARINE DEBRIS WORKSHOP

INTRODUCTION

The first workshop on marine debris in the Gulf of Guinea anchored the framework for co-operation, and for the management of marine debris in the region. The second workshop will assess progress made and upgrade the action plans and others to concretize the achievements.

OBJECTIVES

i) Establish a steering committee with representatives of major parties involved;

ii) Focus on the theme “Land based sources” to reinforce awareness of the marine debris problem;

iii) Expand participation in the management of marine debris issues in the region and involve land locked countries.

IMPLEMENTATION PROCEDURES

i) Establish a steering committee with representatives of major parties involved;

ii) Canvas for hosts and other local logistics;

iii) Develop a Draft Agenda;

iv) Assign responsibilities;

v) Invite land locked countries as upland sources of debris;

vi) Prepare a report;

vii) Commence the second phase of programme implementation.

LEAD IMPLEMENTING ORGANIZATION: IOC (IOCEA)
IMPLEMENTATION TIME-FRAME: DEC 1996
COST : US$ 20,000

ANNEX III

OPENING SPEECH BY DR TOBOR

Invited guests, Distinguished Ladies and Gentlemen,

One of the traditional uses of the sea is that it serves as a convenient vast dumping ground for all types of wastes" ranging from raw human wastes, vehicle scraps, drums, plastics, disuse tyres, discarded nets, empty cans of food, garbage and salvage from ships, packages containing harmful substances and freight containers accidentally and discharged from ships, and floating logs. TO this list can be added in case of Nigeria tons of water hyacinth which drift to the lagoons, wither on contact with salt water and sink to the bottom where the debris is carried to the shelf leg currents during low tide.

Harmful Effects of Marine Debris

Marine debris constitute obstacles to trawling operations on the shelf, and are menace to navigation. They blanked up the sea floor and seriously affect marine benthos. Accidentally discharged contains of dangerous substances pose serious health hazards to man and marine resources. Under water corrosion of metal debris can also impair the quality of water and harm living resources. Oil sticks reduce the aesthetic value of beaches.

Sources of Marine Debris

Marine debris originate from many sources which include as earlier mentioned:

(a) municipal wastes and discards, the beaches;
(b) sea flowing rivers, themselves dumping ground for cities and towns on their banks;
(c) fishing trawlers operating in coastal and offshore waters;
(d) cargo carrying vessels and
(e) activities of oil.

Companies Operating in Coastal Waters - Reduction of Marine Debris

The grantity originating from cities and towns of marine debris especially those can be effectively reduced by recycling of discards and wastes, for example

(a) Metal discards can be converted to useful products.
(b) Papers can be recycled.
(c) Municipal wastes including human can be converted into manure. In case of human wastes, the water resulting from the process can be treated and used for aquiculture. In fact, nature does not allow wastes.
(d) Effective patrol of coastal and offshore waters to monitor the activities of vessels especially of those seeking dumping grounds in developing countries like ours for harmful industrial wastes.

There is need for cooperation among member states of the Gulf to minimize the incidents of marine debris in our waters and keep the Gulf clean. This essential for the sustainable development of the Gulf resources.

Creation of awareness among our people of the short and long term harmful effects of marine debris to man and the sustainable development of marine resources has become very important.

It is my hope that the workshop will come up with plans and strategies for implementation for reducing marine debris in the Gulf of Guinea.

Thanks to IOC for sponsoring the workshop.

ANNEX IV

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