

World Maritime University

# The Maritime Commons: Digital Repository of the World Maritime University

---

World Maritime University Dissertations

Dissertations

---

1989

## Integrated marine management education programme for personnel involved in marine systems in Nigeria

Lawrence Omubor Pubara Bereiweriso  
*World Maritime University*

Follow this and additional works at: [https://commons.wmu.se/all\\_dissertations](https://commons.wmu.se/all_dissertations)

---

### Recommended Citation

Bereiweriso, Lawrence Omubor Pubara, "Integrated marine management education programme for personnel involved in marine systems in Nigeria" (1989). *World Maritime University Dissertations*. 1314. [https://commons.wmu.se/all\\_dissertations/1314](https://commons.wmu.se/all_dissertations/1314)

This Dissertation is brought to you courtesy of Maritime Commons. Open Access items may be downloaded for non-commercial, fair use academic purposes. No items may be hosted on another server or web site without express written permission from the World Maritime University. For more information, please contact [library@wmu.se](mailto:library@wmu.se).

# WMU LIBRARY

WORLD MARITIME UNIVERSITY

MALMÖ, SWEDEN

AN INTEGRATED MARINE MANAGEMENT EDUCATION PROGRAMME FOR  
PERSONNEL INVOLVED IN MARINE SYSTEMS IN NIGERIA

by

Lawrence Oubor Fubara Bereiweriso

Nigeria

A paper submitted to the Faculty of the World Maritime University  
in partial satisfaction of the requirements for the award of a

MASTER OF SCIENCE DEGREE

in

MARITIME EDUCATION AND TRAINING (NAUTICAL).

The contents of this paper reflect my personal views and are not  
necessarily endorsed by the UNIVERSITY.

Signature: 

Date: October 10, 1989

Supervised and assessed by:

  
Professor Gunnar Kullenberg

Secretary,

Intergovernmental Oceanographic Commission

UNESCO

Visiting Professor World Maritime University

Co-assessed by:

Mrs. Stella Maris A. Vallejo

Ocean Economics and Technology Branch

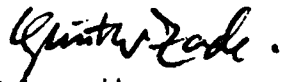
United Nations, New York

Visiting Professor World Maritime University

Ginther Zade

Professor

World Maritime University



## TABLE OF CONTENTS

CHAPTER	PAGE
ACKNOWLEDGEMENT	i
LIST OF ABBREVIATIONS	iii
LIST OF FIGURES	vi
LIST TABLES	vii
DEDICATION	viii
AN INTEGRATED MARINE MANAGEMENT EDUCATION PROGRAMME FOR PERSONNEL INVOLVED IN MARINE SYSTEMS IN NIGERIA	
<u>INTRODUCTION</u>	
- Importance of manpower training/education in marine affairs	x
- Ocean Management: a new evolving field of knowledge	xi
- Objectives of the study	xii
- Objectives of the programme	xii
- Sources of information	xiv

CHAPTER 1 : THE ROLE OF COASTAL AND MARINE AREAS IN  
NATIONAL DEVELOPMENT

<u>1.1. Overview of Nigeria's coastal and marine areas</u>	
1.1.1. Geographical aspects	1
1.1.2. Environmental aspects	6
1.1.3. Demographic aspects	9
1.1.4. The resource endowment	10
<u>1.2. Legal and institutional aspects</u>	
1.2.1. The Law of the Sea Convention	13
1.2.2. Other legal instruments	16
1.2.3. The institutional framework	21
1.2.4. The educational system in Nigeria	26
<u>1.3. Activities in Nigeria's coastal and marine areas</u>	
1.3.1. Shipping, ports and harbours	30
1.3.2. Offshore oil and gas exploration and exploitation	33
1.3.3. Fisheries	35
1.3.4. Land reclamation	40

1.3.5. Other marine related activities	41
--	----

## CHAPTER 11 : CONFLICT ANALYSIS

2.1. Major types of conflicts in Nigeria's coastal and marine areas	43
2.2. Matrix with Actual and Potential conflicts between uses	47
2.3. Establishment of an order of priorities	53
2.4. Why an integrated marine management approach is necessary?	58

## CHAPTER 111 : PROPOSALS AND RECOMMENDATIONS

3.1. Introduction to an integrated marine management approach to sea - uses	60
3.2. Marine Affairs at the World Maritime University	71
3.3. Recent developments in support of ocean and coastal management in Canada, the Netherlands and Malta	72
3.4. <u>Proposal for an integrated marine management education programme</u>	74
3.5. Specification of course modules	83
3.6. Funding and establishment of the programme	93

<u>CHAPTER IV :</u>	<u>CONCLUSIONS</u>	97
BIBLIOGRAPHY		99
APPENDIX 1 :	CONVENTIONS, PROTOCOLS, ADMENDMENTS AND CODES NOT RATIFIED AS OF DECEMBER 1988	104
APPENDIX 2 :	SIMULATION EXERCISE (TENTATIVE THEMES)	107
APPENDIX 3 :	TEACHING FACILITIES AND EQUIPMENT	108
APPENDIX 4 :	ANALYSIS OF IMPLICATIONS/EFFECTS	109
APPENDIX 5 :	SEA FISHERIES DECREE NO. 30 1971	111

## ACKNOWLEDGEMENT

I am profoundly grateful to God for sustaining me whilst at World Maritime University and my family for their prayers and ensuring my participation in this advanced level training programme.

I would like to thank my institution, the Rivers State University of Science and Technology, and the Federal Ministry of Transport for nominating me to do this course at the World Maritime University.

My special thanks also go to the Secretary-General of the International Maritime Organization (IMO) for providing me with this Fellowship which was specifically made available to his office to study at the World Maritime University.

I would like to express my gratitude to the entire faculty and staff of the World Maritime University for their help and assistance in various ways.

I am grateful to my course Professor and Vice-Rector, Gunther Zade for his special interest, advice and help; Professor Vanchishwar for his encouragement and challenge; others are Lecturer Stephen Cross and Mr. Richard Poisson (Librarian) for correcting my draft; Lecturers Burton Russell and Hans Van Walen for supplying me with useful materials and Mr. Bertil Wagner for his advice on the computer model; Professor Rosengren of the University of

Rhode Island for reading my initial draft; Professor Mann Borgese of the International Ocean Institute for her initial reactions and comments; Prof. A. D. Couper of the University of Wales Institute of Science and Technology (UWIST), Mr. Kenneth Lucas of Agro Dev. Canada Inc., Mr. G. Peet of the International Law of the Sea of the University of Uthreth and Dr. D. Elder of the Union for Conservation of Nature and Natural Resources who gave me many useful ideas and much constructive comment which have strengthened the work.

Others are Mr. Mwanza of the Economic Commission for Africa; Dr. Q-B West of the Food and Agriculture Organization of the United Nations (African Regional Office); Mr. Jean-Claude Brethes of the International Centre for Ocean Development and Mr. Tomasz Sudra of the United Nations Centre for Human Settlements (HABITAT) for information concerning the financing of the programme.

I will at this juncture also give my special thanks and gratitude to Professor G. Kullenberg of the Intergovernment Oceanographic Commission (UNESCO) for supervising the project and his willingness to participate in the programme and Mrs. Stella Maris A. Vallejo of the Ocean Economics and Technology Branch of the United Nations for providing me with useful materials, ideas and co-assessing this project.

Last but not least, Irene Sundström, Norma Niklasson and my colleagues: Messrs. Wan Shukry, Kundagi, Soe, Wajilda, Kpe, Darkey, Okwuosa, Taty-Boussiana and J. Delgado who



have discussed the content and contributed ideas and example.

### LIST OF ABBREVIATIONS

- CIDA - Canadian International Development Agency
- CNA - Clean Nigerian Association
- ECA - Economic Commission for Africa
- ECOWAS - Economic Community of West African States
- ECWA - Economic Commission of Western Asia
- EEZ - Exclusive Economic Zone
- EIA - Environmental Impact Assessment
- GIS - Government Inspector of Shipping
- GNP - Gross National Product
- FAO - Food and Agriculture Organization of United Nations
- IAEA - International Atomic Energy Agency
- IART - Institute of Agriculture Research and Training
- ICOD - International Centre for Ocean Development

ICONA - Interdepartmental Coordinating Committee for  
North Sea Affairs

IFERT - Institute of Flood, Erosion, Reclamation and  
Transportation

IMO - International Maritime Organization

IOI - International Ocean Institute

IPS - Institute of Pollution Studies

IUCN - International Union for conservation of Nature and  
Natural Resources

LDC 1972 - Convention on the Prevention of Marine  
Pollution by Dumping of Wastes and other  
Matters 1972

LNG - Liquefied Natural Gas

MAN - Maritime Academy of Nigeria

MFAG - Medical First-Aid Guide

MARPOL 1973/78 - International Convention for the  
Prevention of Pollution from Ships 1973  
as modified by the Protocol of 1978  
relating thereto

NEPA - Nigerian Electric Power Authority

NIOMR - Nigerian Institute for Oceanography and Marine  
Research

NMA - Nigerian Maritime Authority

NNPC - Nigerian National Petroleum Corporation

NORAD - Norwegian Aid for Development

NPA - Nigerian Ports Authority

NSC - Nigerian Shippers Council

NSS - Nigerian Security Service

OALOS - United Nations Office for Ocean Affairs and the  
Law of the Sea

SIDA - Swedish International Development Agency

UASC - Union of African Shippers Councils

UNCLOS 111 - United Nations Conference of the Law of the  
Sea 111

UNDP - United Nations Development Programme

UNEP - United Nations Environmental Protection

UNESCO - United Nations Education, Scientific and Cultural  
Organization

USAID - United States Agency for International  
Development

WACAF - West and Central African  
Project for Monitoring Pollution in the Marine  
Environment of West and Central African Region

Decree No. 30 of 1971 - Sea Fisheries Decree 1971

Decree No. 28 of 1978 - Exclusive Economic Zone Decree  
1978

### LIST OF FIGURES

FIGURE	PAGE
1.1 PHYSICAL MAP OF NIGERIA	2
1.2 THE NIGERIAN CONTINENTAL SHELF	3
1.3 LOCATION OF THE SUPERFICIAL LAYER AND UPWELLING ZONES DURING THE NORTHERN SUMMER	11
1.4 MAP OF THE NIGER DELTA SHOWING SOME OF THE OFFSHORE OIL INSTALLATIONS	13
1.5 UNEP REGIONAL SEAS PROGRAMME AREAS	20
1.6 OFFSHORE EXPLORATORY ACTIVITY	34
1.7 PELAGIC FISH RECORDINGS	36

## LIST OF TABLES

TABLE	PAGE
1.1 NIGERIAN FISH PRODUCTION BY SECTORS IN METRIC/ TONNES 1980 - 1985	36
1.2 NIGERIAN FISH PRODUCTION BY INDUSTRIAL SECTOR IN METRIC TONNES	38
2.1 MATRIX WITH ACTUAL AND POTENTIAL CONFLICTS BETWEEN USES	48
3.1 INTEGRATED MARINE MANAGEMENT EDUCATION PROGRAMME MODEL	64
3.2 MATHEMATICAL MODEL OF THE INTEGRATED MAIRNE MANAGEMENT EDUCATION PROGRAMME	66

## DEDICATION

This work is specially dedicated to my late father  
Mr. Levi Fubara Bereiweriso, my mother Mrs. Rechael  
Bereiweriso and my brother Mr. Patterson Tam Bereiweriso.

AN INTEGRATED MARINE MANAGEMENT EDUCATION PROGRAMME FOR  
PERSONNEL INVOLVED IN MARINE SYSTEMS IN NIGERIA

## INTRODUCTION

### Importance of manpower training/education in marine affairs

The design for an integrated marine management educational programme for Nigeria is undertaken because of the following reasons:

- the importance of manpower training/education in marine affairs in creating public awareness of environmental issues with the study of all aspects of the ocean and coastal management at the local, community, state, national, regional and international levels;
- the benefits of a problem-oriented training/education course for participatory strategies and for the development of technical skills;
- the need for proper development, conservation and protection of the ocean and coastal resources for building up the necessary knowledge, a cadre of expertise (technical, scientific, managerial, etc.) and for strengthening national infrastructure in order for Nigeria to exercise effectively its rights and opportunities and assume its new obligations under the new ocean regime;
- the recommendation of the United Nations Environmental Programme (UNEP) Regional Seas Report and Studies No. 27 on the Action Plan for the Protection and Develop-



ment of the Marine Environment and Coastal Areas of the West and Central African Region, that for the countries in the sub-region are to implement the "Action Plan" adopted in 1981 to control marine pollution and the management of marine and coastal resources; the plan requires that:

- .1 An intensive training programme including seminars, symposia, etc, should be formulated in the early phases for the training of local scientists and technicians so as to bring them abreast with current developments in rational environmental management practices;
- .2 Regional courses for training of officials in environmental assessment and in the reduction and control of coastal pollution be conducted;
- .3 Seminars, workshops or meetings to inform or make officials aware of the problems related to the sound management of the environment, particularly in the development of coastal areas be conducted; and
- .4 Inclusion of environmental concepts in school curricula and bringing environmental questions to the attention of the public be practiced (UNEP Regional Seas Reports and Studies No. 27, 1983).

**Ocean Management : a new evolving field of knowledge**

Ocean Management is a new, evolving field of knowledge which is particularly dependent upon, and which closely interacts with, various sectors and disciplines. Conse-

quently, a training/educational programme in this field should expose participants to a broad range of subject areas, including pure science, natural and physical sciences, social sciences, policy analysis and law, particular (applied) techniques for resource assessment, also strategies for planning and management.

#### Objectives of the study

The basic purpose of the study is to design a Maritime Management Education Programme for preparation of a training/education programme to improve the analytic competence of the participants on issues relating to marine management, performance improvement and approaches to strategic management techniques.

#### Objectives of the programme

Specifically, the objectives of the Programme are in two folds which are the following:

- .1 To familiarize the participants with all the major uses of the marine environment and its resources in their interaction and with a system's approach to management;
- .2 To assist participants in the on going process of harmonizing national legislation and integrating the policies of national and international institutional structures to optimize the contribution from the marine sector towards the Gross National Product (GNP), with due consideration for the conservation of the marine resources and the marine environment for the present

succeeding generations.

The Programme because of its multidisciplinary nature, is opened to personnel from the following Ministries or Departments or Agencies in the marine systems:

- Transport;
- Fisheries;
- Defence;
- Petroleum Resources;
- Education;
- Science and Technology;
- Customs;
- Immigration;
- Marine Police (Coast Guard);
- Security Service;
- Fire Brigade/Service;
- Port Health;
- Justice;
- Finance and Planning;
- Works, Housing and Environment;
- Information and Tourism;
- Hydroelectric Division; and
- Telecommunications.

In view of the above, chapter one of this paper is a general introduction which gives a brief overview of Nigeria's sea -uses; what is going on and who is involved.

Chapter two concentrates on conflict analysis in respect

to the responsibilities of Personnel/Departments. It identifies the sea-use conflicts and assesses the implications of these uses for each major sea-use and establishes a process of dealing with conflicts and why an integrated integrated marine management approach is necessary.

Chapter three has two parts: part one stresses the importance of the integrated management approach to sea-use activities with examples drawn from countries such as Canada, the Netherlands and Malta. The second part deals with proposals and recommendations for an integrated marine management education programme, the funding and the establishment of the programme.

Chapter four contains conclusions.

#### Sources of information

The sources of information for this study has been on:

- .1. Personal interviews and subsequent write ups of the dialogues as carried out with experts in the marine industry in Nigeria;
- .2. Extraction of a lot of information from the various respected international experts in marine affairs with reference to their publications which were collected for this purpose;
- .3. By the various lectures and lecture notes received from numerous marine experts in their fields that had come to WMU as visiting lecturers and professors; and

.4. All the various exposure/experience gained during the author's field training excercises in the following countries: The Netherlands; Federal Republic of Germany; Germany Democratic Republic; France; The Soviet Union; United States of America; Great Britain; Canada; Danmark and Sweden.

## CHAPTER 1

# THE ROLE OF COASTAL AND MARINE AREAS IN NATIONAL DEVELOPMENT

### 1.1 Overview of Nigeria's coastal and marine areas

#### 1.1.1. Geographical aspects

##### .1. Physical

Nigeria is situated on the shores of the Gulf of Guinea along the west coast of Africa. The southerly point near Brass in the area of the Niger Delta in the Rivers State of Nigeria is about 4 degrees north of the Equator, while the northern boundary is approximately at 14 degrees north (figure 1).

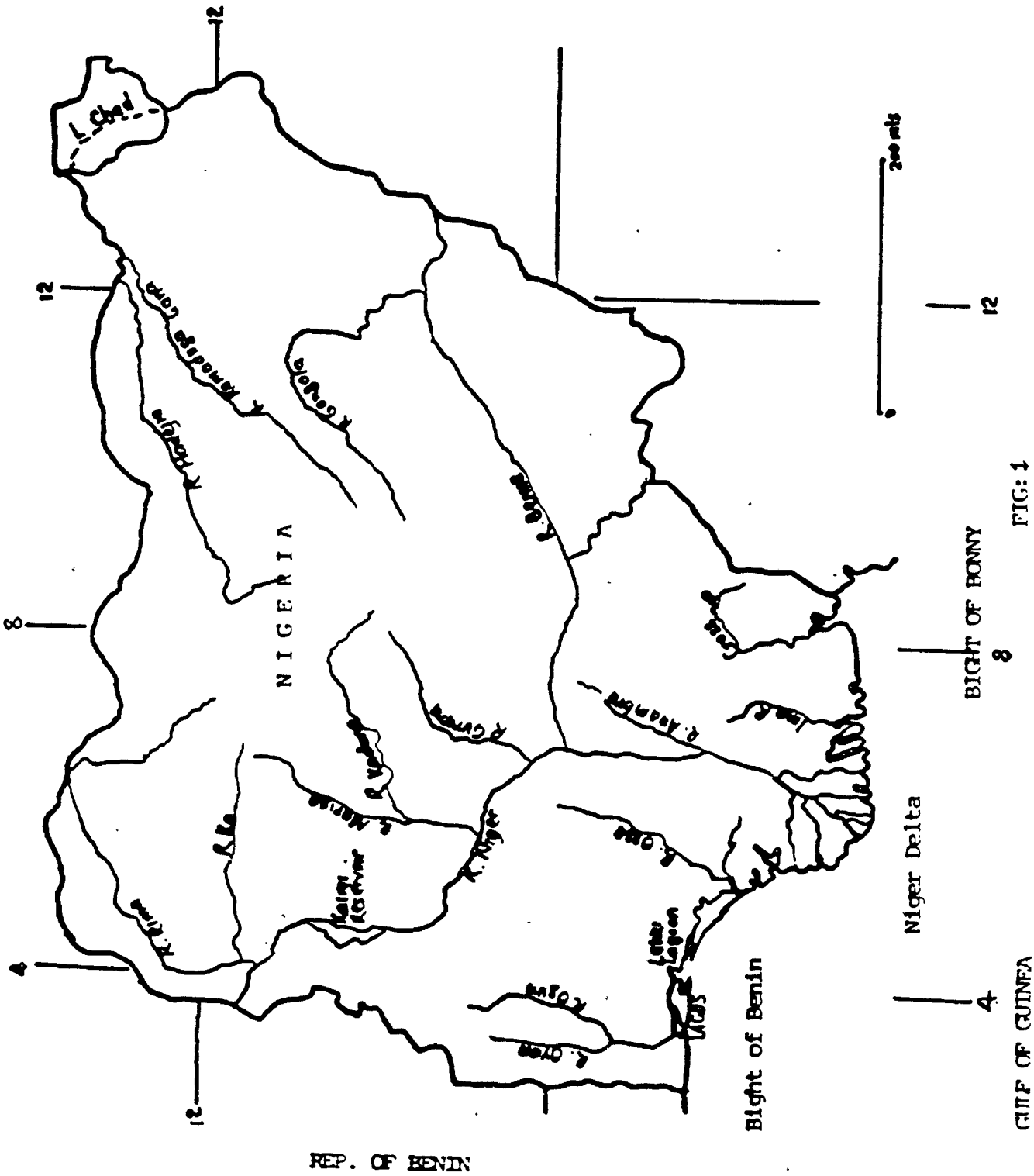
Her neighbour to the west is the Republic of Benin, to the east is the Republic of Cameroon, to the north the Niger and Chad Republics and to the south is the Atlantic ocean.

The major rivers are the Niger and Benue. The Niger enters the country from the northwest and runs in a south-easterly direction till it receives the water of its principal tributary, the Benue, at Lokoja about 547 kilometres from the sea. The Benue river enters the country via the Republic of Cameroon and flows into the river Niger at Lokoja.

Nigeria has a relatively straight coast line of approximately 850 kilometres. Nigeria has 21 states on

PHYSICAL MAP OF NIGERIA

CAMEROUN







Three types of soil are found in Nigeria. They are the acid and nutrient-poor latosolic soils, the lateric soils, (also poor) and the relatively fertile red loams.

The rivers Niger and Benue with run-off transport of suspended matter, influencing coastal water conditions.

The geology of Nigerian coastline is influenced by types of deposition of rocks, earth movement, relief, drainage and climate.

## .2. Morphology

The Nigerian coast line is mainly formed from deposits through wave motion; deltas associated with most of the rivers, usually with mangroves swamps and marshes.

The shores are always subjected to both erosion and accumulation of terrigenous material. The coastline is also characterized by a system of offshore bars and lagoons. The bar system is caused by swells coming from the south which some times make the coast rather inaccessible. Continental shelf - (figure 2).

## .3. Sedimentology

Along the coast of Nigeria there is sedimentary deposit of 5 -6 kilometre thickness and some times reaching 8 kilometre in a large depression near the Niger delta. The Niger Delta receives sediments from an extended hinterland and is sandy with marginal estuaries and barrier islands.

Terrigenous sediments predominate over the greater part of the coastal areas. In the north 50 to 80 per cent of all sediments are terrigenous. In the Gulf of Guinea and near the Angolan coast the terrigenous component in sediments reaches 90 per cent. This is a result of large quantities of suspended material from the Niger which is 67 million tonnes per year.

#### .4. Surface winds

The wind direction with the Nigerian coast is not stable. The average force of wind is 3 - 6 metre per seconds, the weakest in the central parts and the strongest in the northern and southern parts.

The sea-land breeze system is developed along the coastline with an onshore breeze in the afternoons and an offshore at night. The onshore breeze is usually stronger than the offshore. The sea-land breeze influences the prevailing seasonal winds considerably: along the coast of Guinea strong south-westerly winds often replace the seasonal winds in the afternoon.

Nigeria is mainly dominated by south-west mooson which is strong and reaching furthest north during summer (rainy season). In between these wind systems the doldrums occur, with weak or varying winds. The south west mooson is usually regarded as a slightly deflected continuation of the south east trades, hence no doldrum-like transition in between.

## .5. Air temperature

In winter (dry season) the air temperature is +20 - 26 degrees centigrade. Maximum temperature is about +32 - 36 degrees centigrade. Minimum temperature is about +12 - 16 degrees centigrade.

In summer (rainy season) the average temperature is +20 - 26 degrees centigrade. Annual fluctuations of air temperature at sea surface are 0 -2 degrees centigrade.

## .6. Humidity, precipitation and cloud conditions

The average value of relative humidity of the atmosphere is 70 - 75 per cent annually. The average precipitation is 2,000 milimetre per year. Thunderstorms occur frequently and the cloud conditions are influenced by the low water temperatures. Fog is also frequent in the area.

### 1.1.2. Environmental aspects

The mangrove swamps dominate most of the Nigerian shoreline and especially in the Niger Delta. They provide nurseries and feeding grounds for many commercially important species of fish and crustaceans. The silt roots, lower trunks and mud surface usually support a varied fauna of oysters, snails, barnacles, crabs and invertebrates.

The upper part of the mangrove trees are essentially the terrestrial environment for mammals, birds, insects and more so are used for firewood.

The Nigerian marine environment is always subjected to marine pollution and dumping of wastes both natural and man made ones.

Full knowledge about the Nigerian marine environment, its existing uses, resources, potential and the effects of the substance on the Nigerian marine environment is essential and requires continued and constant marine research assessment as noted by G. Peet (1988) for the full understanding of the consequences of environmental pollution.

The pollution of the marine environment is always an international matter requiring an international approach as prescribed by the 1973/78 MARPOL Convention.

Nigeria is not yet party to the MARPOL 73/78 Convention and some other international conventions relating to marine pollution and environmental protection.

The IMO conventions, such as MARPOL 1973/78 governing ship based pollution, if ratified, would provide the basis for reducing pollution or maritime hazards which increase the risk of incidents such as collision leading to oil or chemical spills.

Because a similar convention on the prevention of marine pollution by Dumping of Wastes (LDC 1972, 1975) which had been ratified by Nigeria provided the basis for the national outcries and support from other nations as experienced in the " Koko dumping of toxic waste incidence" in 1988 which it is hoped would be a sad history where a lot of lessons had to be learned (West Africa, June 20, 1988).

However, a number of conventions on the prevention and control of the various forms of pollution are still to be concluded by Nigeria and further elaborated into the national legislation which may somehow minimize the pollution problems.

Ships discharging wastes, for instance, may do so only in accordance with stringent regulations concerning types and quantities of waste materials.

With the introduction of the recently promulgated Environmental Protection Decree in December, 1988 following the "Koko Dumping of Toxic Wastes" (use of a site at Koko in Bendel State by an Italian - Nigerian company to store 2000 tonnes of industrial waste, illegally dumped by an Italian business syndicate) incidence by the Federal Government, this could tighten up and control environmental problems but at the same time plunge some industries into some economic difficulties.

A reasonable and gradual solution must be found because as it is reported in the Newswatch of July 18, 1988 that many industrial companies exploit the lack of national legislation to do as they wish and that the Lever Brothers (a detergent manufacturing company) is one of the few companies which have a waste treatment system in Nigeria (Newswatch July 18, 1988).

Another environmental problem is the possible overfishing in the Nigerian waters through poaching by neighbouring and foreign fishing vessels as asserted in this chapter .

Under the Sea Fisheries Decree No. 30 of 1971, regulations

are made on fishing in certain areas, and this has been established to prevent depletion of fish stock. This is also a matter affecting employment in the fishing industry.

Maritime security, marine surveillance and enforcement procedures are needed to ensure observance of all regulations. This demand an ever more extensive system and suitable equipment for such operations in identifying vessels discharging and loading oil at sea or fishing in prohibited areas.

Coordination of work of the responsible Ministries and their Departments/Personnel and communicating to them and international cooperation are indispensable here.

#### 1.1.3. Demographic aspects

Nigeria, with over 100 million (93.6 million in 1983 by the World Bank estimates) population, has a land area of about 924,000 square kilometres.

Well over half of the population of West Africa, and between one-fifth and one-sixth of that of Africa as a whole, lives in Nigeria (World Fertility Survey, 1981/82).

Nigeria is the world's sixth most populous nation, the sixth largest oil exporter, and whose domestic product is greater than that of the rest of Africa put together (West Africa 5-11 June, 1989).

The major languages spoken are Yoruba, Ibo and Hausa. The official language is English and there are over 300 distinct indigenous tongues or dialects (Worldmark

There are urban centers along the coast of Nigeria such as Lagos, Port Harcourt, Calabar, Warri and Oron. Many industries such as fishing, oil, steel, shipping, tourism are located in Lagos, Port Harcourt and Warri. These centers contribute greatly to the economy of Nigeria.

#### 1.1.4. The resource endowment

##### .1. Living resources

It is a known fact that the upwelling phenomenon in the Gulf of Guinea off the coast of Nigeria (figure 3) provides a mechanism for high productive and distribution of living resources in the EEZ.

This generates in the distribution of fishery resources which makes the coastal pelagic resources very rich in flat sardinelas, the bongà, the cunene horse mackerel, the yellow horse mackerel and the spanish mackerel.

The distribution of demersal species on the bottom are of two large groups which are the croakers and the snappers on the hard or sandy bottoms and the large pink shrimps on soft bottoms.

Apart from the strong domestic market demand in Nigeria, there is a permanent and increasing market for fish on world markets, especially for certain species which may not be of special interest on the home market. For example there are great possibilities to catch and process shrimp and tuna for export, principally to the United States of

America, Europe and Japan.

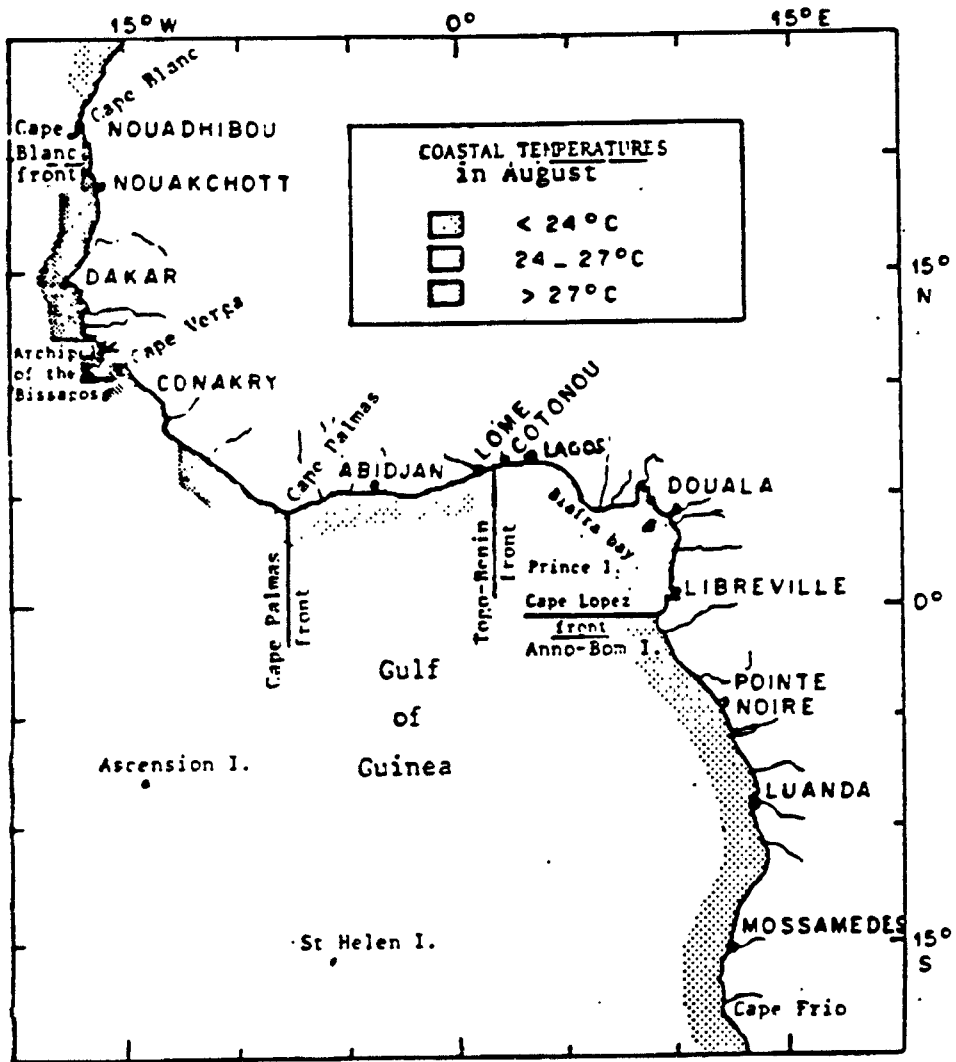


Figure 3 - Location of the superficial layer and upwelling zones (surface  $T^{\circ} > 24^{\circ} C$ ) during the Northern summer



## **.2. Petroleum, gas and other mineral resources**

Knowledge of the continental shelf of Nigeria (figure 2) is being intensified now ever than before though with limited bathymetric charts. It is evident that in relation to many modern uses of the sea bed, such as laying of pipelines, installation of drilling platforms, exploration of sand, gravel and mineral deposits, such charts showing exclusive economic zone are a prerequisite.

Small concentration of manganese (Mn) 0.1 - 0.2 per cent is found in Nigeria especially near the mouth of the Niger which has concentrations, up to 1.0 - 1.5 per cent. Such a distribution of Mn in the coastal zone is explained by its close connection with the clay fraction of sediments. The clay fraction is largely transported further offshore. That is why its maximal concentrations are located in sediments and Fe-Mn nodules of deep oceanic basins (Nezianya, 1986).

The average concentration of iron (Fe) in sediments of the northern parts reach 1 - 3 percent. In the Gulf of Guinea, especially near the mouths of Niger and Congo rivers, there are rather high concentration of Fe (up to 10 - 12 percent). Presence of such concentration can be explained by the transport of large quantities of iron-run suspended matter from lateritic area.

The shallow water environment immediately contiguous to continental Nigeria (figure 4) has been associated with the exploitation of petroleum resources mostly from the porous sandy stones. The continental shelf has large deposits of sand aggregate resources offshore and also oil and gas deposits in and around the Niger Delta.

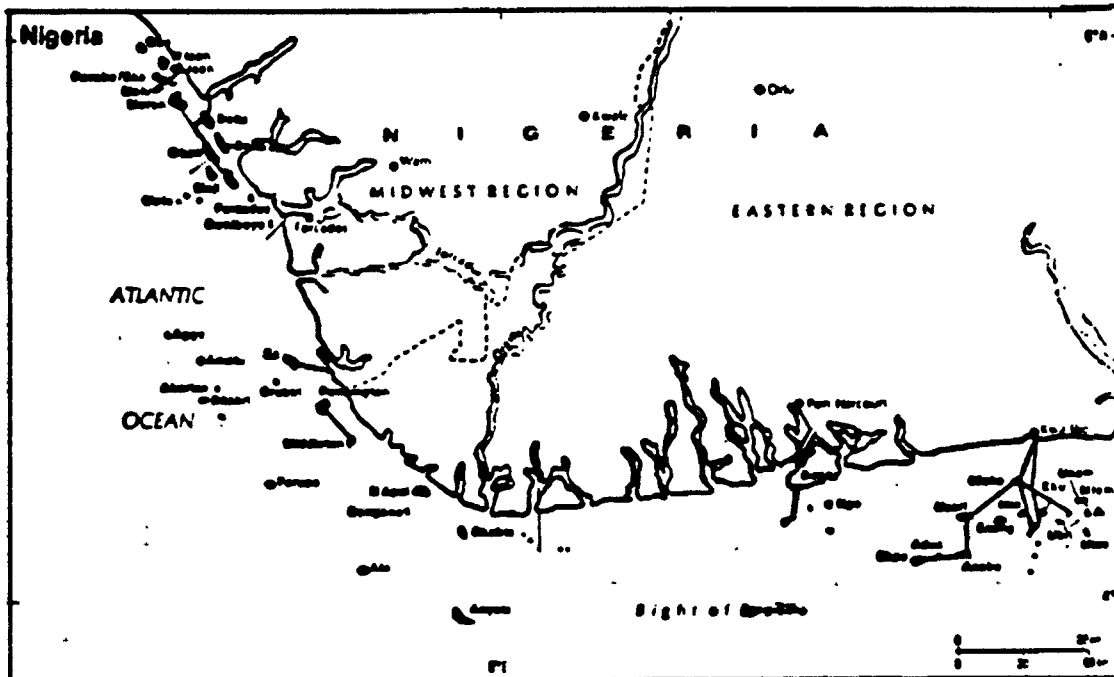


Fig 4 Map of the Niger Delta showing some of the Offshore oil installations

Other natural resources also found in Nigeria's coastal area include the red mangrove trees and the coconut trees which are used for food production and canoe construction.

## 1.2 Legal and constitutional aspects

### 1.2.1 The Law of the Sea Convention

Immediately after independence in 1960, Nigeria's legal territorial sea area stood at 3 nautical miles, 12 nautical miles in 1967, and 30 nautical miles before the Law of the Sea (UNCLOS 111) Conference in 1971. Nigeria ratified the Law of the Sea (UNCLOS 111) Conference on the

14th of August, 1986.

Nigeria took early advantage of the UN Conference of the Law of the Sea (UNCLOS 111) by declaring a 200 nautical mile Exclusive Economic Zone (EEZ) in 1978 (T. O. Ajayi, 1982).

Within this zone, and subject to the universally recognised rights of other states (including land-locked states), Nigeria can exercise certain sovereign rights especially in relation to the conservation or exploitation of the natural resources (minerals, living species, etc) of the sea bed, its subsoil and superjacent waters and the rights to regulate the establishment of artificial structures, installations, and marine scientific research, amongst others (LT. General O. Obasanjo, 1978).

The UNCLOS 111 and the EEZ provides Nigeria with the legal framework to exercise the rights, obligations and opportunities to protect the safety of life and property, maintenance of peace, justice and progress of all peoples within her marine environment and also to control marine pollution.

The 1978 EEZ Decree, otherwise known as Decree No. 28, incorporates other decrees such as 1967 No. 5, 1969 No. 51 and 1971 No. 30, and states that:

- .1 Without prejudice to the territorial waters Decree 1967, the Petroleum Decree 1969 or the Sea Fisheries Decree 1971, sovereign and exclusive rights with respect to the exploration and exploitation of the natural resources of the seabed, subsoil and super-

jaacent waters of the Exclusive Economic Zone shall vest in the Federal Republic of Nigeria and such rights shall be exercisable by the Federal Military Government or by such Federal Commissioner or agency as that Government may from time to time designate in that behalf either generally or in any special case.

.2 Subsection (1) of this section shall be subject to the provisions of any treaty to which Nigeria is a party with respect to the exploitation of the living resources of the Exclusive Zone.

.3(i) For the purpose of exploring and exploiting, conserving and managing the natural resources and other activities for the economic exploitation and exploration of the Exclusive Zone, the appropriate authority may establish, or permit the establishment, operation and use by any other person subject to such conditions as may be prescribed, in designated areas:

- a. artificial islands;
- b. installations and structures.

(ii) The appropriate authority may, for the purpose of protecting any installation in a designated area by order published in the Gazette, prohibit ships, subject to any exceptions provided in the order, from entering without its consent such part of that area as may be specified.

(iii) If any ship enters any part of a designated area in

contravention of an order made under this section, its owner or master shall be liable on conviction to a fine of 5,000 naira or imprisonment for 12 months or to both unless he proves that the prohibition imposed by the order was not, and would not on reasonable inquiry have become, known to the master.

- (iv) In this section, "designated area" means any area of the Exclusive Zone so designated by appropriate authority for the purpose of subsection (1) above.

#### 1.2.2 Other legal instruments

##### .1. International Maritime Organization's Conventions:

According to the International Maritime Organization (IMO) Treaty Status of 1988, out of the 39 IMO Conventions, Amendments, Protocols and Codes, only 11 have either been ratified, accepted, approved or acceded to by Nigeria which are as follows:

- .1 International Convention for the Safety of Life at Sea, 1974 as amended (SOLAS 1974);
- .2 Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974 as amended (SOLAS PROT 1978);
- .3 Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended (COLREG 1972);

- .4 Convention on Facilitation of International Maritime Traffic, 1965, as amended (FAL 1965);
- .5 International Convention on Load Lines, 1966 (LL 1966);
- .6 International Convention on Tonnage Measurement of Ships, 1969 (TONNAGE 1969);
- .7 International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969);
- .8 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND 1971);
- .9 Torremolinos International Convention for the Safety of Fishing vessels, 1977 (SFV 1977);
- .10 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW 1978); and
- .11 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended (LDC 1972).
- .2. **Bilateral/Regional Agreements with the neighbouring countries in the West and Central African Subregion:**

There are some regional bodies which Nigeria is actively involved in. These include the United Nations Environmental Programme (UNEP) Regional Seas and United Nations Intergovernmental Oceanographic Commission Committee for

Central Eastern Atlantic (IOCEA).

These regional bodies came in to being sequel to the United Nations Conference on the Human Environment, which took place in Stockholm between 5 - 16 June, 1972 where an "Action Plan for the Human Environment" was adopted including the General Principles for Assessment and Control of Marine Pollution.

In the light of the results of the Stockholm Conference, the United Nations General Assembly decided to establish the United Nations Environmental Programme to "serve as a focal point for environmental action and coordination with the United Nations System" (General Assembly resolution XXVII of 15 December 1972).

The organizations of the United Nations System were invited "to adopt the measures that may be required to undertake concerted and coordinated programmes with regard to international environmental problems", and the regional seas programme was initiated by UNEP in 1974 and since then the Governing Council of UNEP has repeatedly endorsed a regional approach to the control of marine pollution and management of marine and coastal resources and has requested the development of regional action plans (UNEP Regional Seas Reports and Studies No. 46, 1984).

After a preparatory process, which include a number of experts meetings, fact finding missions and in-depth studies on the resources and environmental problems of the region, the Conference of Plenipotentiaries on the cooperation in the Protection and Development of Marine and Coastal Environment of West and Central African Region

(Abidjan 16 - 23 March 1981) adopted:

- .1. The Action Plan for the Protection and Development of Marine Environment and Coastal Areas of West and Central African Region;
- .2. The Convention for cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region; and
- .3. The Protection concerning cooperation in combating Pollution in case of Emergency.

The Governments of the region also established a trust fund to support the activities called for in the Action Plan. UNEP was designated as the Secretariat of the Action Plan and the Convention.

There are bilateral regional agreements related to marine disasters such as marine pollution (figure 5). Such disasters, marine pollution in particular, are an international problem because the risk of a major tanker accident or an oil platform blowout can affect coastlines often many miles away from the incident which caused it.

This can only be effectively tackled by all neighbouring countries in the subregion by combining their resources and acting together as adopted in 1981 "Action Plan" in Abidjan to control marine pollution and the management of marine and coastal resources. Furthermore, it requires signing and adopting the MARPOL 73/78 Convention and other



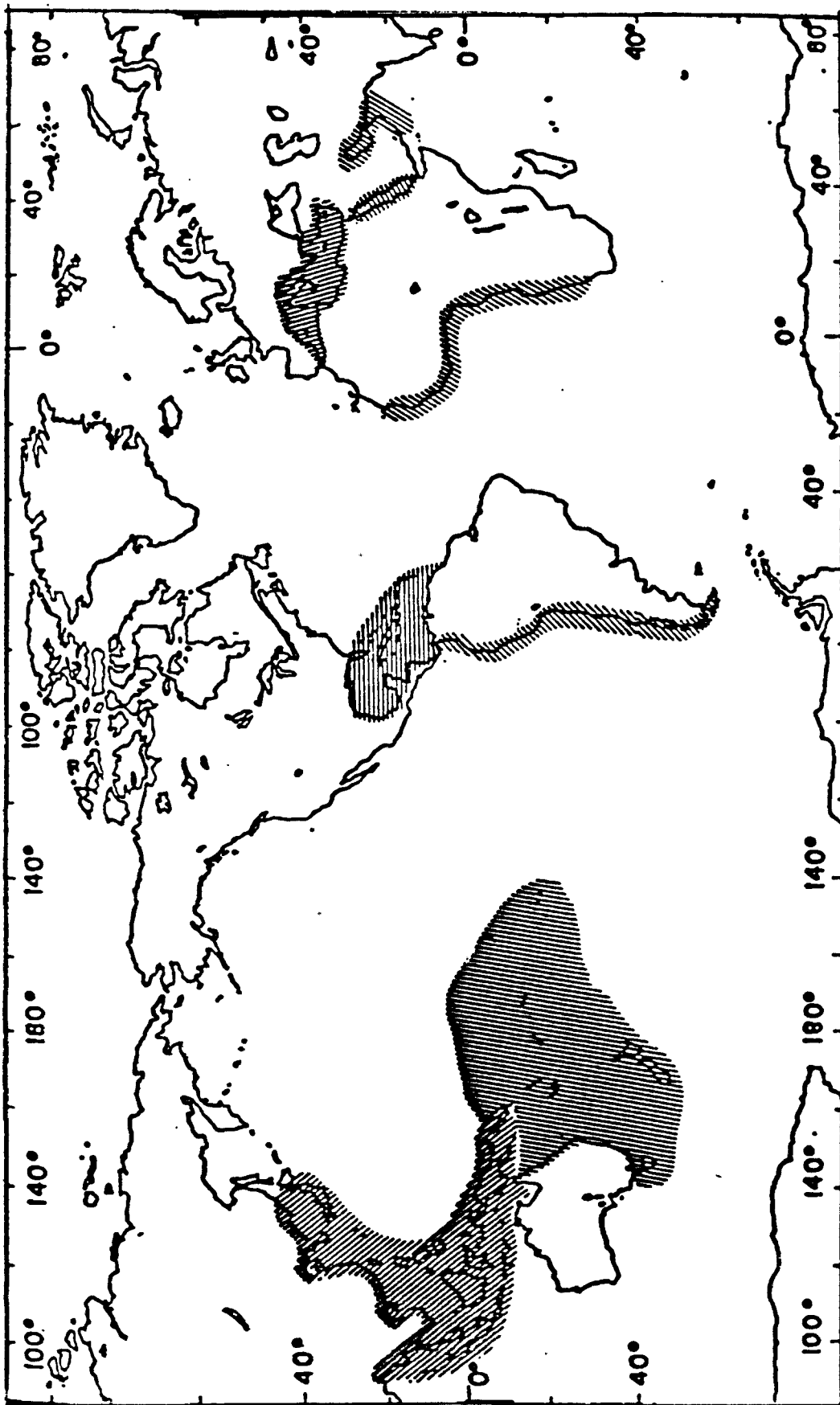


Figure 5 : UNEP Regional Seas Programme Areas

international conventions relating to marine pollution and environmental protection (see appendix 1).

The belief is that through high scientific and technical programmes and through cooperation with United Nations agencies and other international organizations, Nigeria will reach the unattainable uses of the sea and its resources because the sea still remains virtually untapped for the purpose of Nigerian economy and potentially can provide the resources badly needed for national development.

Therefore, Nigeria should take the lead by using the information contained in this study to formulate and implement management and control measures in marine environmental problems.

### 1.2.3 The institutional framework

It has been identified that at least fourteen or more Ministries and their Departments/Personnel with the distribution of experience and knowledge in different parts of the marine system both at the Federal and State levels are involved in one way or the other in the marine environment namely:

#### 1. Ministry of Transport

- . Government Inspector of Shipping (GIS)
- . National Maritime Authority (NMA)
- . Nigerian Ports Authority (NPA)
- . Nigerian Shippers Council (NSC)
- . Inland waterways Division

- . Central Water Transport Corporation
- 2. Ministry of Agriculture and Natural Resources
  - . Federal Department of Fisheries
- 3. Ministry of Defence
  - . Nigerian Navy
  - . Nigerian Air Force
  - . Nigerian Army (Amphibious Brigade)
- 4. Ministry of Petroleum Resources
  - . Nigerian National Petroleum Corporation (NNPC)
- 5. Ministry of Education
  - . Universities.
- 6. Ministry of Science and Technology
  - . Nigerian Institute for Oceanography and Marine Research (NIOMR)
  - . Research Institutes
- 7. Ministry of Internal Affairs
  - . Department of the Customs
  - . Department of the Immigration
  - . Department Nigerian Police (Marine Police)
  - . Nigerian Security Service (NSS)

8. Ministry of Health

- . Department of Port Health

9. Ministry of Justice

- . Justice Department

10. Ministry of Works, Housing and Environment

- . Flood and Erosion
- . Environment

11. Ministry of Information and Tourism

- . Tourism and Recreation

12. Ministry of Mines and Power

- . Nigerian Electric Power Authority (NEPA) -  
Hydroelectric Division

13. Ministry of Telecommunications

14. Ministry of Finance and Planning

Marine activities and the responsible departments

In practice, the division of work or duties amount to the followings:

- . regulation of shipping and traffic - GIS, NMA, NPA, NSC, Customs.
- . ports and harbours - NPA.
- . search and rescue operations - GIS, Nigerian Navy, Nigerian Air Force.
- . oceanographic, geological and hydrographic surveys and mapping, meteorological services -NPA, NIOMR, Nigerian Navy (Hydrographic Department).
- . marine security and military exercises - Nigerian Navy, Nigerian Air Force, Nigerian Army.
- . fisheries research - Research Institutes, NIOMR.
- . supervision of fisheries - Federal Department of Fisheries.
- . supervision of offshore oil and gas exploration and drilling - NNPC.
- . investigation of offences - Justice Department, Marine Police, GIS, Customs, Immigration, Port Health, Nigerian Navy, Nigerian Security Service.
- . law enforcement - Marine Police, Customs, Immigration, Nigerian Navy, GIS, Port Health, Nigerian Security Service.
- . oil pollution clean up - NNPC/Clean Nigeria Association (CNA).

- . dredging and maintenance of navigation channels and shipping lanes - NPA.
- . pipeline laying - NNPC
- . telecommunication cables - Ministry of Telecommunications.
- . pilotage service - NPA.
- . radio communication with ships - NPA.
- . metreological data (weather forecast), storm, flood warning, shipping information - NPA.
- . land reclamation - Ministry of Works and Housing, NPA.
- . maintenance of lighting, light houses, buoys and other navigational aids in all Nigerian Ports - NPA.
- . waste disposal - Environment, Ministry of Work and Housing.
- . recreation and beaches - Information and Tourism.
- . protection of ports from epidemic - Department of Port Health.
- . medical First-Aid Guide for use in Accidents Involving Dangerous Goods (MFAG) - Department of Port Health.

#### 1.2.4 The educational system in Nigeria

The national policy on education is based on the integration of the individual into a sound and effective citizen, and equal educational opportunities for all citizens of Nigeria at the primary, secondary and tertiary levels, both inside and outside the formal school system.

It has been said several times that one constraints in achieving most of the National Development Plans ever proposed by the Federal Government was the shortage of technical manpower which has hindered in achieving most of the goals in the Plans.

With the inception of the innovative 6-3-3-4 school year (6 years primary school, 3 years middle school, 3 years high school and 4 years college) system of education recently, which braced up itself to the challenging task of finding ways and means of transforming the new educational system into an integrated platform for development based on the traditional values and realities of Nigerian cultural environment.

This system is a tool for the implementation of article 39 of the National Policy on Education (Revised, 1981) which reads:

39 (1) "A greater proportion of education expenditure will be devoted to Science and Technology and 39 (2) Universities and other levels of the education system will be required to pay greater attention to the development of scientific orientation. The ratio of science to liberal

arts students in our universities has been fixed at 60-40 during the Third National Development Plan period. The ratio will continue to be reviewed in accordance with the manpower needs of the country" (Bob-Manuel, K.D.H. 1987).

In keeping with the National Policy of Education, the placing and administration of educational programmes are directed to orientate students in realising their aspirations, developing their attitudes, behaviour patterns, potentials for productive and life-long education.

For effective control and proper management of the new system of education, the Federal Government has adopted a number of strategies which includes:

- monitoring of external factors capable of adversely affecting the educational enterprise and providing remedial measure;
- publication of statistical inventories and educational guidelines;
- development of an evaluative procedure designed to regulate revisions of curriculum content, teaching methods and instructional materials; and
- establishment of an education data bank fully equipped with micro-computer facilities for information processing, storage and retrieval.

The existing maritime training institutions in the country are as follows:



- .1 Maritime Academy of Nigeria (MAN), Oron which trains the seafarers - 2nd mate and 3rd assistant engineers officers for both home trade and foreign going. The Academy also runs refresher courses for masters, mates and engineers home trade and foreign going;
- .2 Nigerian Institute for Oceanography and Marine Research (NIOMR), Lagos trains skippers, mate fishing and coxswain (Ordinary National and Higher National Diplomas are being proposed), and its laboratory is one of those participating in the West and Central African (WACAF)-2 project "Monitoring Pollution in the marine environment of West and Central African Region" (WACAF/2);
- .3 Nigerian Ports Authority Training School, Lagos which trains able-bodied seamen, pilots-in-training (before the award of pilots certificate of competency) and hydrographic survey officers-in-training;
- .4 Rivers State University of Science and Technology, Port Harcourt which trains marine engineers and naval architects both in the first and second degree levels: its Institutes of Pollution Studies (IPS); Flood, Erosion, Reclamation and Transportation (IFERT); and Agriculture Research and Training (IART) conduct laboratory tests and research in pollution and marine environmental problems in Nigerian;
- .5 University of Ibadan, Department of Chemistry laboratory is one of those also participating in the West and Central African (WACAF)-2 project; and

.6 University of Calabar, Institute of Oceanography  
laboratory also participates in the West and Central  
African (WACAF)-2 project.

### 1.3 Activities in Nigeria's coastal and marine areas

Many different marine related activities take place in Nigeria's sea area. They are all of importance to the economy of Nigeria in that they benefit the national income, promote employment and contribute in some other way to the prosperity and well-being of the nation, and the people in particular. Furthermore, they can provide probably more resources if properly coordinated and managed.

The marine related activities are as follows:

#### 1.3.1. Shipping, ports and harbours

Nigeria's sea area is the access route to the large ports of Lagos, Port Harcourt, Warri, Sapele, Calabar, Burutu, Koko, etc.

The most diverse products are carried via the sea area to and from the major industrial centres of the North and Western Europe, North and South America, and the Far East.

A cargo of particular importance to Nigeria is crude oil.

Each year, on average, some 2411 vessels enter the Nigerian ports bringing in some 20,821,466 tonnes of cargo and loading some 396,300 million barrels of crude oil and nearly one million tonnes of assorted cargoes for export.

Throughout Nigeria's sea area, there are about 10,000

shipping movements each year, the majority of them along the Nigerian coast.

The ships are tankers, bulk carriers, container ships, ships with general cargo, ferry boats, coasters, etc, heading to and from Nigerian ports and waters.

The vessels follow a fixed pattern of routes indicated on the nautical charts and marked at sea by buoys and lights. There are special deep-water routes for the largest vessels.

The berthing facilities available in all the ports under the jurisdiction of the Nigerian Ports Authority increased from 12 in the 1955/56 fiscal year to 69 in 1970, and later from 69 in 1970 to 166 in 1981, representing about 240.6 per cent increase (B.M. Tukur, 1982).

The imbalance between the volume of the nation's international sea borne trade and the maximum handling capacity of the ports led to the nerve breaking experience of the mid seventies when Nigeria was confronted with the problem of congestion at her national sea ports.

This led to the huge economic losses to the nation in form of demurrage payments and port congestion surcharges to the tune of over 4.5 billion naira (B.M. Tukur, 1982).

The traffic congestion led to a national awareness, particularly at the governmental level, of the contribution and significance of sea ports to the economic and social development of Nigeria.

The Government in a very responsive manner gave sea port development a desired priority in the Third National Development Plan (1975 - 80), and to the introduction of many new types of specialised ships (ie container ships, roll-on /roll-off, etc) to replace the war built standard tramp ships.

These specialised ships are now the concern of the authorities in charge of shipping, ports and harbours.

In order to monitor with keen interest all the technological innovations in shipping which have implications on the types of facilities provided or will continue to provide at the national ports, the government promulgated a decree on the Nigerian Maritime Authority.

The decree empowers the Nigerian Maritime Authority to enforce the new national shipping policy which was based on the United Nations Convention on the Code of Conduct for Maritime Conference and particularly its cargo sharing formula of 40 :40 :20 (Bereiweriso, 1985).

The aim is to encourage the indogenous shipping companies to purchase their own fleet so as to participate fully in the cargo sharing and a more equitable share for the carriage of Nigerian foreign trade.

But this shipping regulation has drawn a great deal of criticism from the Nigerian trading partners, especially the European community countries which has led the Nigerian officials to convene a meeting in Addis Ababa and informed other African countries of its intention to liberalise the 1987 shipping regulations at an UNCTAD

meeting later in 1989 (West Africa 14-20 August, 1989).

### 1.3.2. Offshore oil and gas exploration and exploitation

In the early seventies, and immediately after the Nigerian civil war (1967 - 1970), there were needs to repair the damages caused by the war and repay the huge payments of external debts (used in purchase of weapons, etc).

These needs increased the activities of oil extraction on the continental shelf, referred to as the "oil boom era" (figure 6).

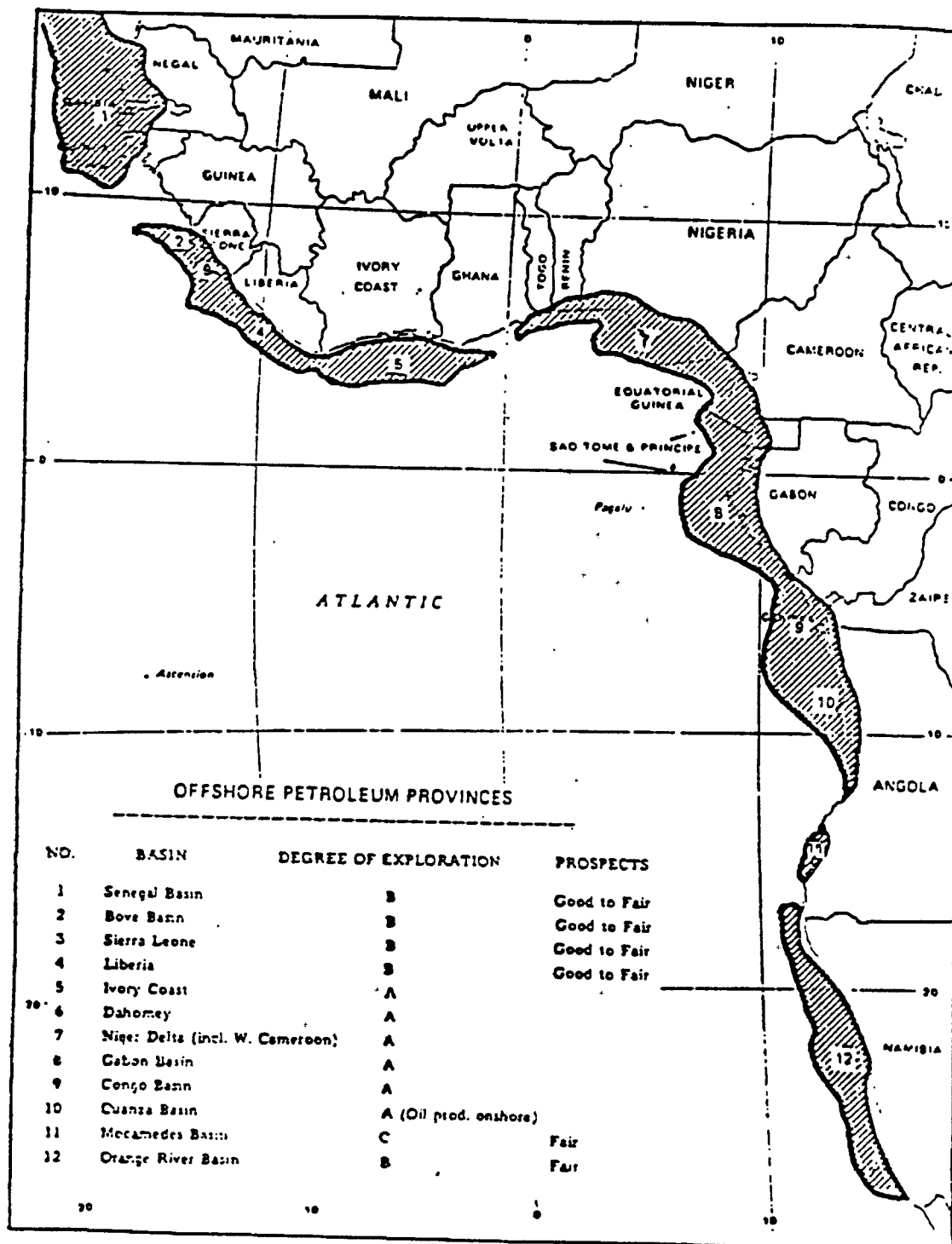
With the discovery of oil in 1956 by the Anglo - Dutch Consortium, Shell D'Archy at Oloibiri in the Rivers State of Nigeria, in 1958 marked the commercial production at the rate of 5,100 barrels per day (C. Nezianya, 1986).

The output rose steadily to 0.415 million barrels per day in 1966 to 2 million barrels per day in 1972 when an oil ceiling was imposed on Nigeria by the Organisation of Petroleum Exporting Countries (OPEC) cartel of about 1.5 million barrels per day.

Nigeria has proven abundant gas reserves that will last for about 100 years. The gas and oil deposits are found mostly in the porous sandy stones in the growth fault system of the Agbada formation (A. Chidi Ibe, 1982). Most of these locations are some 2000 metres below the seabed.

The Nigerian National Petroleum Corporation (NNPC) plans to purchase 10 new coastal tankers ranging from 5,000 Gross Tonnage (GRT) to 20,000 GRT over the next 5 years,

**FIGURE 6**  
OFFSHORE EXPLORATORY ACTIVITY



Sources: World Oil, Oil and Gas Journal and The World Energy Conference

and with MARPOL 73/78 specifications also to have a ship near a field in the Port Harcourt area before the end of 1989.

The ship would be around 60 metres long and 15 metres wide and around 1,000 dead weight tonnage, thus large enough to act as a platform for a mobile gas processing plant.

These tankers are being purchased because the NNPC and the West German's Liquid Gas Investition and Handels (LGI) have signed a two year contract relating to offshore processing and purchase of 250,000 tonns of Nigerian associated gas annually (Lloyd List International, 1988).

### 1.3.3. Fisheries and aquaculture

In recent times, the Federal Government of Nigeria has taken far reaching measures to encourage agriculture (including fisheries and aquaculture), in the face of dwindling oil revenue, and as a step towards self sufficiency and food-for-all by the year 2000.

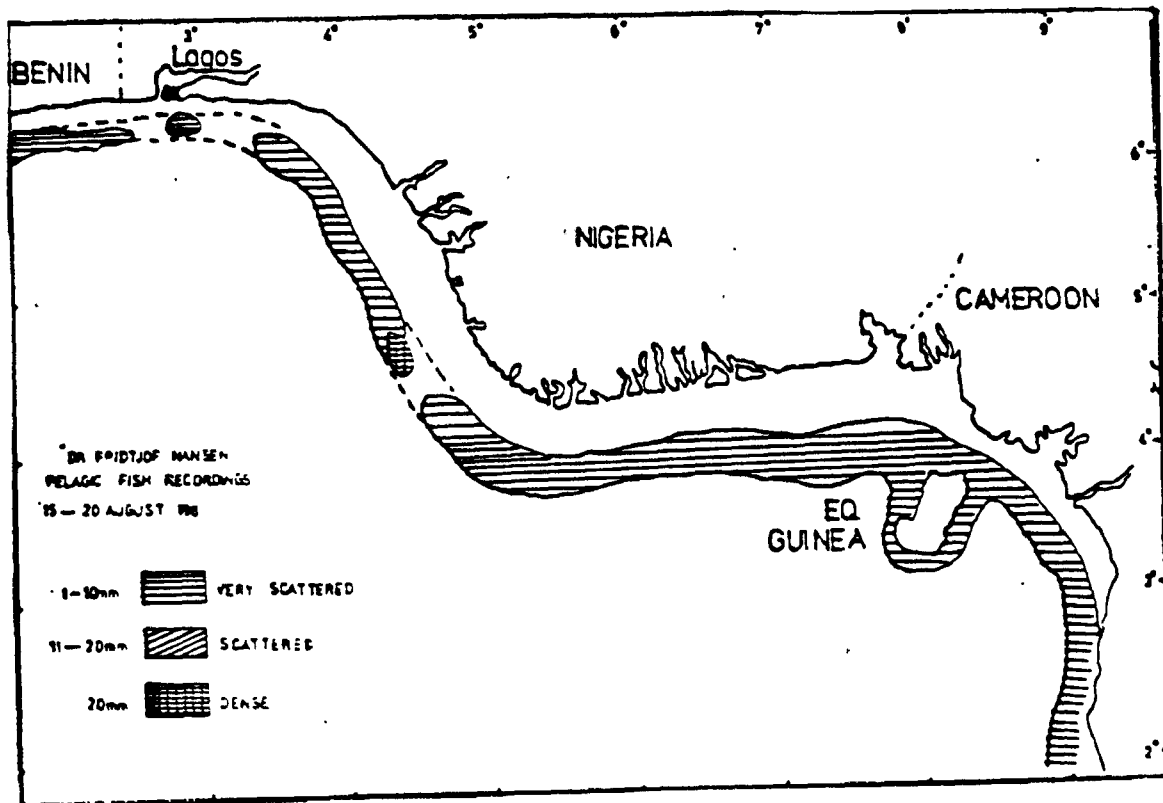
Concrete measures taken by the Government towards this end include enacting a decree to ensure that loans for agriculture shall not be less than 15 per cent and 10 per cent respectively of commercial and merchant banks total loans and advances, reduced interest for agricultural businesses, establishment of Federal Fishing Terminals with slipways and coldstore facilities at all main sea ports within the country.

Fishing is the most exploited marine activity on the sea



area. The sea area abounds with fish: species such as mackerel, sole, tuna, shrimps, among others are found in large quantities (figure 7).

### 1.7 PELAGIC FISH RECORDINGS



The statistics of Nigeria's Fish Production by industrial sector for 1978 to 1985 published by the Federal Department of Fisheries reveals a mean growth of 0.21 per cent from 1983 to 1985.

**TABLE: 1. NIGERIAN FISH PRODUCTION BY SECTORS IN M/TONNES**

ITEMS/	1980 - 1985		
	1980/81	1982/83	1984/85

1. ARTISANAL:

.1. Coastal and Brac-

kiswater	266,935	369,750	227,659
	317,779	370,040	140,656

Inland River and

Lakes	194,429	127,460	99,552
	164,004	131,887	59,319

Fish Farm	-	-	22,012
	-	20,476	15,002

2. INSHORE:

.1 Fishing) Fish	16,342	15,052	22,255
Shrimping)	12,435	13,572	23,768

3. SHRIMP: Inshore

Fishing + Inshore

Shrimping.	1,890	3,525	2,277
	2,003	2,375	1,485

<u>4. DISTANT:</u> (IMPORT)	234,000	244,403	137,717
	245,000	238,854	61,714

<u>TOTAL</u>	713,596	760,195	511,472
	741,221	777,204	301,944

SOURCE: FEDERAL DEPARTMENT OF FISHERIES.

TABLE : 2. NIGERIAN FISH PRODUCTION BY INDUSTRIAL SECTOR

IN METRIC

TONNES INSHORE SHRIMPING AND TRAWLING

ITEMS/TOTAL	1978/79	1980/81	1982/83	1984/85
.1. Fish	15,767	16,342	15,052	22,255
	9,406	12,435	13,572	23,768
.2. No. of Vessels	38	35	65	84
	44	45	61	109
.3. Shrimps	1,910	1,890	3,525	2,277
	1,902	2,003	2,375	1,485
.4. Total				
No. of Vessels	49	45	34	29
	48	36	39	31
.5. Total Catch	17,677	18,232	18,577	24,532
	11,308	14,438	15,947	25,253
.6. No. of Vessels	87	80	99	113
	92	81	120	140
.7. Average Catch/ Vessel	203.10	227.9	187.64	217.09
	122.91	178.24	132.89	180.39

There was a sharp decline in 1983 which was 13,572 tonnes but later picked up in 1984 resulting in a total landing

of 27,255 tonnes representing a 0.39 per cent growth rate which was partly caused by the destruction of the ecosystems and the polluted waters.

Looking at the statistics (Tables 1 and 2), one could also deduce that there was a steady increase in fish production between 1984 and 1985 and this trend will continue.

Nigerian inshore fish trawling prevails at the depths ranging from 10 to 50 metres and it is estimated at about 27,500 metric tonnes per annum.

Further down (50 to 100 metres) it is estimated to be 3,000 to 4,000 metric tonnes of big-eye fish, *Brachydenterus* potential. The whole potential is estimated to be about 30,500 to 31,500 metric tonnes per annum.

The shell-fish resources of the Demersal Inshore Industrial Fishery are mainly the adult pink shrimp and Guinea shrimp. It is estimated that the yield of the pink shrimp should be in the range of 3,200 to 4,000 metric tonnes which should accommodate 40 to 60 shrimp trawlers, each catching 250 kg to 270 kg of shrimps per day.

It is believed that Nigerian vessels could only harvest 2,000 metric tonnes and the balance by vessels from other neighbouring countries poaching in the Nigerian waters.

Looking at the 1985 statistics of fish production, total landing was 23,768 metric tonnes, which shows that 3,732 metric tonnes of fish have not been exploited. In other words, there is about an 86 per cent level of exploitation which is good for the Nigerian economy.

In 1985, the Federal Department of Fisheries recorded the number of companies and fishing vessels as follows :

a. Inshore Fishing Trawler Companies	30	with	109	vessels
b. Inshore Shrimp Trawler Companies	6	with	31	vessels
c. EEZ Fishing Trawler Companies	4	with	10	vessels
d. Distant Water Companies	23	with	40	vessels
			-----	
	Total		109	vessels
			-----	

It should be noted that most of these companies engaged in more than one type of activity.

Nigerians have a strong tradition of fish consumption and there is a firm demand for fish food for her growing population, Fish landings of about 0.5 million tonnes per annum does not satisfy local demand and a substantial quantity is imported to augment the local catch.

Although pressure on the fish stocks has been heavy from foreign fleet of large vessels, but with the provisions of Decree No.28 of 1978 and the Law of the Sea Conference which are designed to control the entry of foreign vessels within the EEZ of 200 nautical miles of each coastal state, should improve the fish stocks.

#### 1.3.4. Land reclamation

Most of the Lagos island, the riverine areas of the Rivers State, the Akwa Ibom State, the Cross River State,

and the Bendel State were extended to accommodate more housing units, roads and bridges, port areas, etc.

These reclaimed areas in the above coastal states were also being planned for horticulture, aquaculture, recreation and natural study and the extension of jetties and ports. The construction costs as one could estimate, would be between 2 to 3 billion naira (800 million dollars).

#### 1.3.5. Other marine related activities

The Nigeria's sea area is the scene of many other marine related activities such as:

- dredging to create and maintain canals, navigation channels, turning basins, harbours and marinas, cutting of pipeline routes so as to lay pipelines, and to obtain a source material for fill or construction (filling relates to the deposition of dredged materials, either for specific purpose of creating real estate or for disposal of the by-product produced during dredging);
- leisure pursuits : swimming, sailing, and angling;
- the extraction of sand and gravel : for the improvement of the beaches and the raising of the land level;
- military exercises : by naval and air forces;
- marine scientific research : by research and educational institutions to gain greater understanding of natural

ecosystem with respect to the prudent utilization of its resources and the protection of the marine environment from the consequences of excessive exploitation and detrimental stress by dumping of waste;

- discharge and dumping of waste materials : both natural and man made that can not be stored on land and these methods of waste disposal are subject to a variety of international regulations and conventions;
- generation of energy by wind and power : although such plans have not yet been elaborated well, research is going on and with time and technology this activity will be carried out on the marine environment; and
- tourism : coastal parks for the enjoyment of recreationers and tourists and marine tourism industry.

## CHAPTER II

### THE CONFLICT ANALYSIS

#### 2.1 Major types of conflicts in Nigeria's coastal and marine areas

In view of the multiple uses of the marine environment, it is desirable not to look at the areas of development on a sectorial basis only but rather on critical cross-sectoral issues and their implications ( eg. the way one sector impinges upon other sectors).

With the Nigeria's sea area being put to many uses, the following problems and conflicts have been identified:

##### .1 Problems with space :

- shipping, fisheries and drilling operations together claim a considerable part available on the sea area;
- owing to the greater tonnage, many vessels, notably tankers are dependent on deep water routes;
- merchant ships, fishing vessels, naval ships, pleasure craft, passenger vessels and local canoes all require adequate space;
- fishing vessels need to operate in the fishing grounds which occupy space suitable as fishing environments;
- pipelines and telecommunication cables on the seabed



also affect space; and

- increase in the number of platforms and offshore drilling rigs in sea area.

.2 Environmental and resource use problems :

Threats to the Nigerian marine environment are largely attributed to :

- ships discharging their oil residues and chemical waste into the sea area;
- dumping at sea of pollutants produced onshore;
- discharge of pollutants via rivers and sewage pipes into the sea area;
- pollution of water via the atmosphere : precipitation of air pollution;
- depletion of fish species;
- polluted beaches; and
- soil erosion and erosion of beaches.

As was reported in the Newswatch of July 18, 1988 that a report of the Ministry of Housing and Environment warned eight years ago that the improper management of industrial wastes in Lagos has reached a stage where it has constituted potential and real danger to human health, natural resources and marine life because Lagos State is

the home of 40 per cent of the nation's industries (Newswatch July 18, 1988).

But discharging at the Nigerian marine environment will continue to go on, legally or illegally, as long as there are inadequate land-based disposal methods (port reception facilities) as required by MARPOL 73/78 Convention.

Marine research and assessment must tie in with the Nigerian marine environmental policy: what knowledge, data and their interpretation is needed for better management and administration?, research institutes and the universities should work together and, where necessary, pool their capacities and knowledge.

### .3 Problems of maritime terrorism and incidence of piracy and armed robbery

Maritime security in the Nigerian waters, marine surveillance and investigation of offences: the marine police, the Nigerian navy, customs, the Nigerian security service, NNPC inpectorate and the oil companies must come to a mutual agreement and arrangement about who does what and where for the following reasons:

- Nigeria is relatively vulnerable because of the numerous maritime activities along her coasts such as the oil refineries, oil jetties, LNG terminal (under constuction), and the numerous oil platforms to terrorist attack and more so on human life.

As was reported on the 21 November 1977 that onboard a Danish general cargo vessel "Mv Lindinger Ivory", off

Lagos, Nigeria, the master was killed and 5 crew injured as they fought off boarding attempt by armed men (ICC International Maritime Bureau, 1986).

Following this report and other unreported incidents along the Nigerian coast and the whole of the West and Central sub-region especially during the "oil boom era", ships were often attacked by gangs of up to 25 men armed with knives and many with guns. They usually attack at night and almost always target roll-on/roll-off and container ships, either in port or anchored near the coast.

Though the IMO has recently suggested very positive measures to help solve the problems:

- but through training/education by the designated programme, and given the total involvement by government, the cooperation and coordination and interaction between departments/personnel will foster on how to deal with a maritime terrorist incident thereby reducing vulnerability of an attack in Nigeria.

#### .4 Problems regarding policy , law, institutions

In Nigeria, the major difficulty lies in the way and means to establish a marine policy in that the interests and uses of resources involved make it impossible to adopt an exhaustive and comprehensive marine policy which would not give rise to some form of criticisms from various departments. And because of this, an ideal marine policy does not yet exist.

Although there is no ideal marine policy in Nigeria, yet

the concept is accepted and integrated into the governmental planning in order to allow Nigeria (by promulgating Decree No. 28 of 1978) to make best use of its sea and its resources.

There is no institutional framework for marine management that takes into account all the marine activities in Nigeria (except in few limited areas like fisheries, shipping, defence).

In Nigeria, the transformation of marine issues has resulted in the problems of adaptation of existing administrative structures which do not make allowances for new and differing marine issues and are thereby comparatively rigid, causing difficulties in both the utilization of the marine potential and implementation of suitable measure with regard to problems never addressed before such as marine pollution control.

## 2.2. Matrix with Actual and Potential Conflicts between uses

The matrix (Table 2.1) shows the actual and potential conflicts between uses. These problems normally lead to misunderstandings and rivalries among the Department/Personnel in arriving at coherent sea policy decisions thereby bringing inefficiency in the overall management of the systems, even though they are supposed to work for a common goal that will lead to the benefit to the systems.

The following actual and potential and conflicts between



## **.1 Fisheries vs Telecommunication cables and Pipelines**

There exist conflicts of uses of the Nigerian sea area between fisheries, telecommunication cables and pipelines which always involve economic and space planning.

Damages caused by fishing vessels and anchor chains are often very costly and in the case of oil pipelines - may have serious impact on the marine environment.

Cutting of pipeline routes affect the mangrove swamps which provide nurseries and feeding grounds for fish. As was observed by Baker, Jenifer M (1983), that the acute short term effects of petroleum hydrocabons are likely to be high mortalities of invertebrates, defoliation of mangroves and death of seedling. In the long term, he continued, that oil is likely to weather comparatively quickly and both mangrove and invertebrate re-colonization (Baker, 1983).

## **.2 Shipping, Ports, and Harbours vs Oil Pipelines**

There exist conflits of uses of the sea area between shipping, ports, harbours and pipelines. Damages caused by anchors from anchoring ships always involved with potential environmental damage through pollution and economic loss as a result of repair costs.

### .3 Oil and Gas development vs Fisheries

There exist conflicts of uses of the sea area between the exploration of oil, gas and the fishing activities.

The exploration exercises always impose limitation on fishing activities due to restriction of space imposed by safety zone which poses economic problems to these local fishermen and competition for space.

As was reported in the Newswatch of July 18, 1988 that the Riverine village of Iko, in Akwo Ibom State saw enough of the devastations of pollution as the Egbema people in the Rivers State because of the flaring of gas by the Shell Oil Company in the area. That the flourishing village known for its fish trade was transformed into the ghost town and "now, there is no fish to be caught" because dangerous gases were emitted from the gas flared and an acrid smell hung constantly in the air. (Newswatch July 18, 1988).

### .4 Oil and Gas exploration vs Shipping, Ports and Harbours

There are conflicts between the exploration of oil, gas and shipping, ports and harbours.

The shipping routes and sites for the exploration of oil and gas always compete for the same space which poses economic problems to both activities.

Example as reported in the Daily Times of June 23, 1988 that the NPA was frustrating the NNPC's efforts at putting the oil depot at Calabar into operation, which has been lying idle. According to the report, the delay was

described as "scandalous example of the bureaucratic relation that government projects face from government agencies" (Daily Times June 23, 1988). The oil depot delay may not be unconnected with shipping routes and space.

This kind of bureaucratic reactions or riffle always bring factors that delay early take off of governmental projects.

Furthermore, the initial location of ministerial responsibility for projects, lack of familiarity and firm commitment to the overall philosophy to be pursued also pose some economic problems to both activities.

#### .5 Military exercises vs activities in the marine environment

Military exercises limit the use of sea space.

Here, coordination is needed to achieve a satisfactory division of space available which depicts sound physical planning in the marine environment taking special account of the areas which are particularly important to other sea users.

#### .6 Wastes Disposal vs Fisheries

Dumping of wastes has conflicts with fisheries. Example was the dumping of all types of wastes, including decomposing bodies, continue to form dangerous toxic liquid which leachats and seeps into nearby rivers such as River Ogba which has a government fishing project.



Tests have shown that a high level of ammonia in concentrations as much as 300 mg per litre in Ogba river, compared to a normal permissible level of 0.02 mg per litre.

Lead concentrations known to be highly toxic are similarly high and an international report of emissions of industrial processes also said that Nigeria and other developing countries may have levels of toxic emissions several thousand times higher than the highest reading taken in developed countries (Newswatch July 18, 1988).

#### .7 Dredging vs Fish and other Living Organisms

Dredging and filling activities adversely affect the estuarine system in a variety of ways. They create short and long term changes in water currents, circulation, mixing, flushing and salinity, add to the water turbidity, siltation, pollution, and lower the dissolved oxygen.

The effect of dredge and fill is the direct destruction of habitat and also submerged bottoms or coastal wetlands along with their associated organisms which are directly destroyed by these processes.

In addition to the direct loss of habitat, dredging and fill also causes the removal, transportation and deposition of sediment which creates and disperse large quantities of silt and debris.

The large sediment particles quickly settle out of the water column but the finer particles can be carried for extensive distances up to half a mile before settling out. The finer sediment are easily suspended by tidal and wind

currents. Suspended silt creates a number of adverse environmental impacts such as:

- physical smothering of the bottom dwelling plants and animals as it settles;
- smothering of fish by clogging their gill structures while suspended;
- fish and other mobile organisms not killed are usually driven from the area;
- modification of the behaviour of the remaining organisms;
- high turbidities reduce vision and mask odours which affect the survival of many fish; and
- decrease light penetration into the water which reduces photosynthesis, decreased productivity and lowered dissolved oxygen concentration.

### 2.3 Establishment of an order of priorities

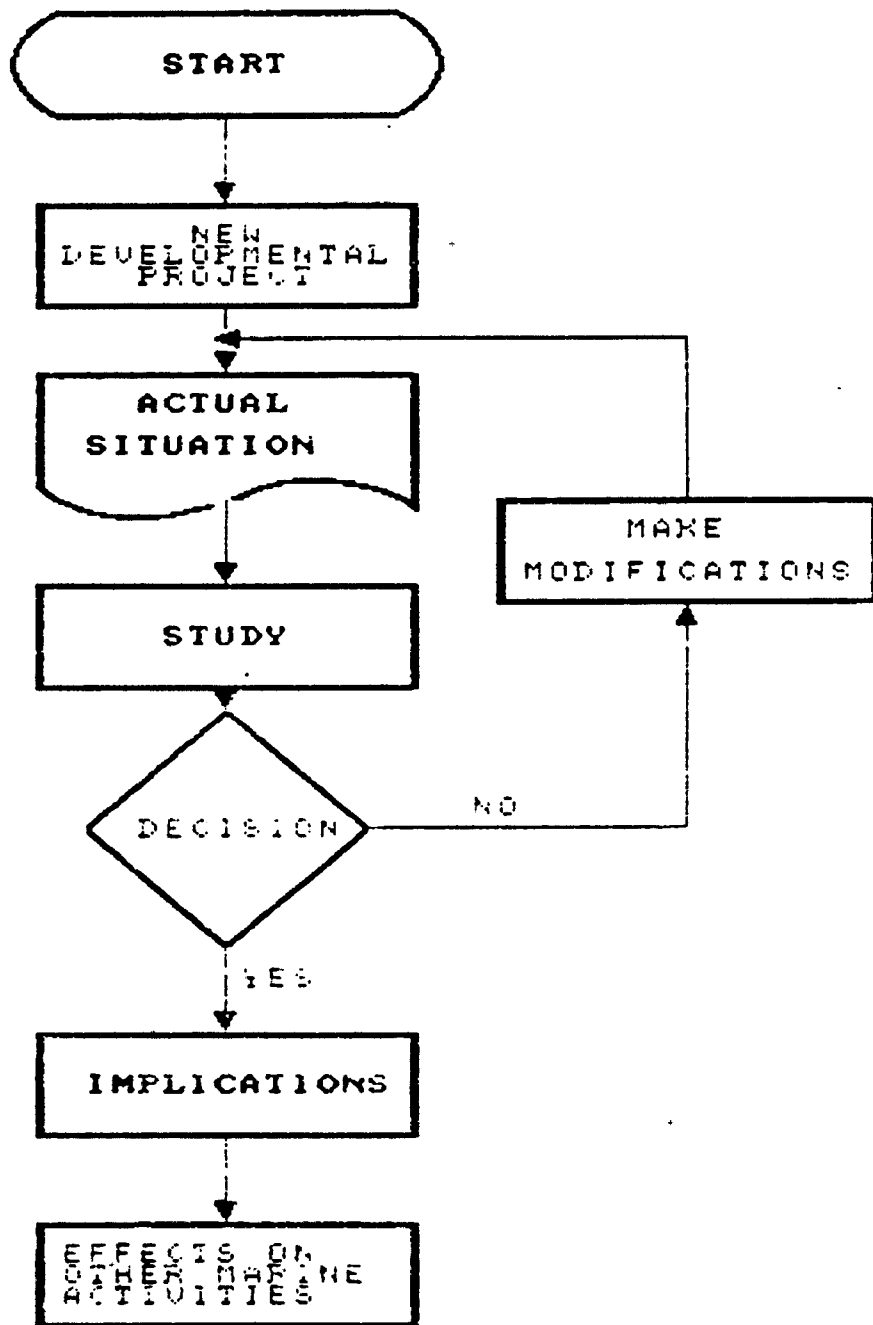
In order to establish an order of priorities, an environmental impact assessment (EIA) has to be undertaken to study the potential effects of a proposed action on the marine environment and comparisons of options/alternative choices based on required data base, inventories, modeling, predictions and economics (G. Kullenburg, 1988).

To achieve that, a simulation exercise model figure 2.1 has been designed where relevant data on the marine

environment were collected and will be used to establish an order of priorities.

TABLE 2.1

**SIMULATION EXERCISE MODEL**



The flow chart of the model indicates that:

- .1 A new developmental project on the marine environment has been proposed or is going to take place;
- .2 The policy or decision makers should look at the actual situation of things and the economy, define the targets and what shall be protected in the particular case by listening or seeking advice from independent scientists;
- .3 They should study the costs and benefits of the proposed project, consider the potential effects of low-level and long-term exposure and contamination build up; and
- .4 They should then decide either the proposed project be sent back for modifications or to find out more on the possible implications and effects on other users or other marine activities.

By this method, they establish priorities on those developmental projects that have least implications (socio-economic-political) and ecological/environmental effects on other users or marine activities.

Simulation is a planning and teaching technique and is a necessary element in learning in terms of adding understanding to the information transfer process (S.J. Singh and C.F. Chan, 1988).

D. McCabe (1986) in his paper entitled "Simulation and

Games in Teaching and Learning" cited the importance of simulation in teaching for the following reasons:

- to integrate material from several subjects;
- to promote student participation in learning;
- to provide a risk free environment for experiment;
- to provide a broad view of the subject at the start of the course;
- to ensure a broad view of the subject at the end of the course;
- to implement theory;
- to enable students to respond to a changing environment;
- to enable students be able to do things, as well as to know of things;
- to expose students to problem solving under confusing and ill defined circumstances;
- to enable students to discover relationships between concepts instead of being told them;
- to arouse students interest in the subject; and
- to allow important elements of the course to be based on actual performance of skill.

The purpose of the introduction of the simulation exercise model figure 2.1 is to help and aid the decision maker in the order of priorities to what developmental projects to undertake after due considerations have been given to the implications and effects these projects would have on other users or other marine activities.

The simulation exercise model therefore provides:

- .1 Data for the visualization of the implications and effects of any developmental projects by the decision maker;
- .2 Testing for the realistic simulation of the various marine activities on the marine environment;
- .3 Coordination for the realistic simulation of a developmental project by collaborating with other users and the improvement of team work between the decision maker and other marine Departments/Personnel; and
- .4 An integrated approach for research and training purpose.

It should be noted that the next generation of computers will be able to make decisions on their own, such as: what type of marine activities to be given priorities in the developmental projects ?.

#### 2.3.4 Data collection

In order to use the above model, data as shown in table 2.1 is going to be collected and stored in the computer so as to keep an up-to-date inventory of the various marine activities that take place on the marine environment.

These data will form a data bank comprising of all the marine activities with their various implications and effects on other users (see appendix 4).

## 2.4 Why an integrated marine management approach is necessary?

The integrated marine management approach is necessary for the following reasons :

- .1. The chapter has shown that any sea use can not be undertaken in complete isolation of other uses and that Departments/Personnel are complementary and interdependent to one another;
- .2. The complexity of the marine environment creates a situation in Nigeria in which it is no longer possible to conduct and carry out any developmental marine activities without some form of integration among the various Departments/Personnel in the marine systems;
- .3. The complexity stems from the overlapping jurisdiction and functions of the Departments/Personnel in the areas of planning, management, and conduct of marine related activities which affect other users because there are many different uses and resources. However, one is presently dominating - oil;
- .4. Marine activities and the resources influencing the environment need to be coordinated which include :
  - shipping, ports and harbours;
  - fishing and aquaculture;
  - offshore oil and gas exploration;
  - other mineral extractions;
  - energy production;
  - recreation including tourism and uses of beaches

- land reclamation;
- disposal of waste;
- military exercises; and
- marine scientific research.

.5. Alterations to the marine environment such as oil pollution and man made destructions which have resulted in the marine environmental problems, such as:

- degraded water quality;
- decline in near shore fisheries due to pollution and natural changes in the environment;
- destruction of mangroves and estuaries; and
- acceleration of erosion processes by inappropriate construction practices and other human activities.

.6. Resource planning, effective public marine management education and consistent regulation for marine environmental development needed to mitigate mounting conflicts among users and, the management personnel and to achieve suitable level of development; and

.7. In the next chapter, the type of education and how this education would be achieved and executed will be proposed.



## CHAPTER III

### PROPOSALS AND RECOMMENDATIONS

#### 3.1 Introduction to an integrated marine management approach to sea - uses

Despite the views of the multiple uses of the sea, the ocean zones and the continuing awareness of the environmental impact there has been little or no attention given to an integrated marine management approaches involving the whole coastal zone for industrial purposes in Nigeria.

A former Nigerian graduate of the World Maritime University recalled this in his thesis "Problems of Development and Management of Ocean Resources in Nigeria" (C. Neziyanya, 1986). In particular he dealt with the multiple sea - use conditions, conflicts between hydrocarbon exploitation, the fragile mangrove ecosystem and the fisheries resources.

He further stressed the need for education of the public and the various officials of the enforcement agencies.

Furthermore, the recommendation of the Exepert Group meeting on Acquisition of Marine Science and Technology - Addis Ababa, 19 - 23 October, 1987 of the Economic Commission for Africa (ECA), also stressed the need for the training of the middle and high level professional cadres for the purpose of identifying and measuring the potential of the marine living and non-living resources; and for the negotiation between African countries at the

subregional level as well as with developed countries (ECA, 1987).

The Nigerian marine environment is rich in variety of natural, commercial, recreational, industrial and esthetic resources of immediate and potential value to the present and future well-beings of Nigerians.

The increasing and competing demands upon the lands and waters of the marine environment occasioned by the production of mineral resources and fossil fuel, transportation, waste disposal and harvesting of fish, shell fish and other living marine resources, having resulted in the loss of living marine resources, wild life, nutrient-rich areas, permanent and adverse changes to ecological systems, decreasing open space for public use and shore line erosion.

There is need therefore to preserve, protect, develop and where possible to restore and enhance the resources of Nigeria for its present generation while keeping options open for future and succeeding generations (Brundtland Bulletin, 1988).

In view of the above, I intend to propose and point out what type of education and how this education would be achieved and executed.

Considering the continuing industrial developments every year on the coastal zone, and especially:

- the vulnerability of the oil refineries, oil jetties, LNG terminal (under construction) and the numerous oil

platforms on the marine environment to terrorist attack and more so on human life which are currently posing a serious threat to the economy of Nigeria, it would be desirable that the personnel involved in the managements of the marine systems to participate in such a course in order to arouse the sense of awareness and broaden their knowledge in the following areas:

- the marine systems;
- marine sciences;
- advanced studies in marine management; and
- marine affairs, so as to improve the analytical competency of the participants on issues relating to approaches to marine management, performance and improvement.

Specifically, the programme is to familiarize the participants with all the major uses of the marine environment and its resources in their interactions and with a system's approach to management and to them in the on going process of harmonizing national legislation and integrating the policies of national and international institutional structures to maximize the contribution of marine sector to GNP, with due consideration for the conservation of marine resources and marine environment.

This will result to better approaches to sea - use planning and management.

The question is : what is an integrated marine management education programme ?

The integrated marine management education programme is

the bringing in together the interactions, interrelationships and complementarities of all the sectoral managements inputs of the marine activities in the sea area or the marine environment into an integral component or comprehensive picture so as to foster communication, cooperation and coordination amongst the Departments/Personnel in the marine systems in order to have a more comprehensive and coherent sea policy on both the national and international level.

In order to show the relationship of the programme to the marine activities and the sectoral managements, Table 3.1 has been designed to help clarify this. Table 3.1 shows that the gap between the marine systems in the areas of communication, cooperation and coordination will receive better attention and be fostered by the programme, and also minimize the differences and conflicts between the activities in the marine environment.

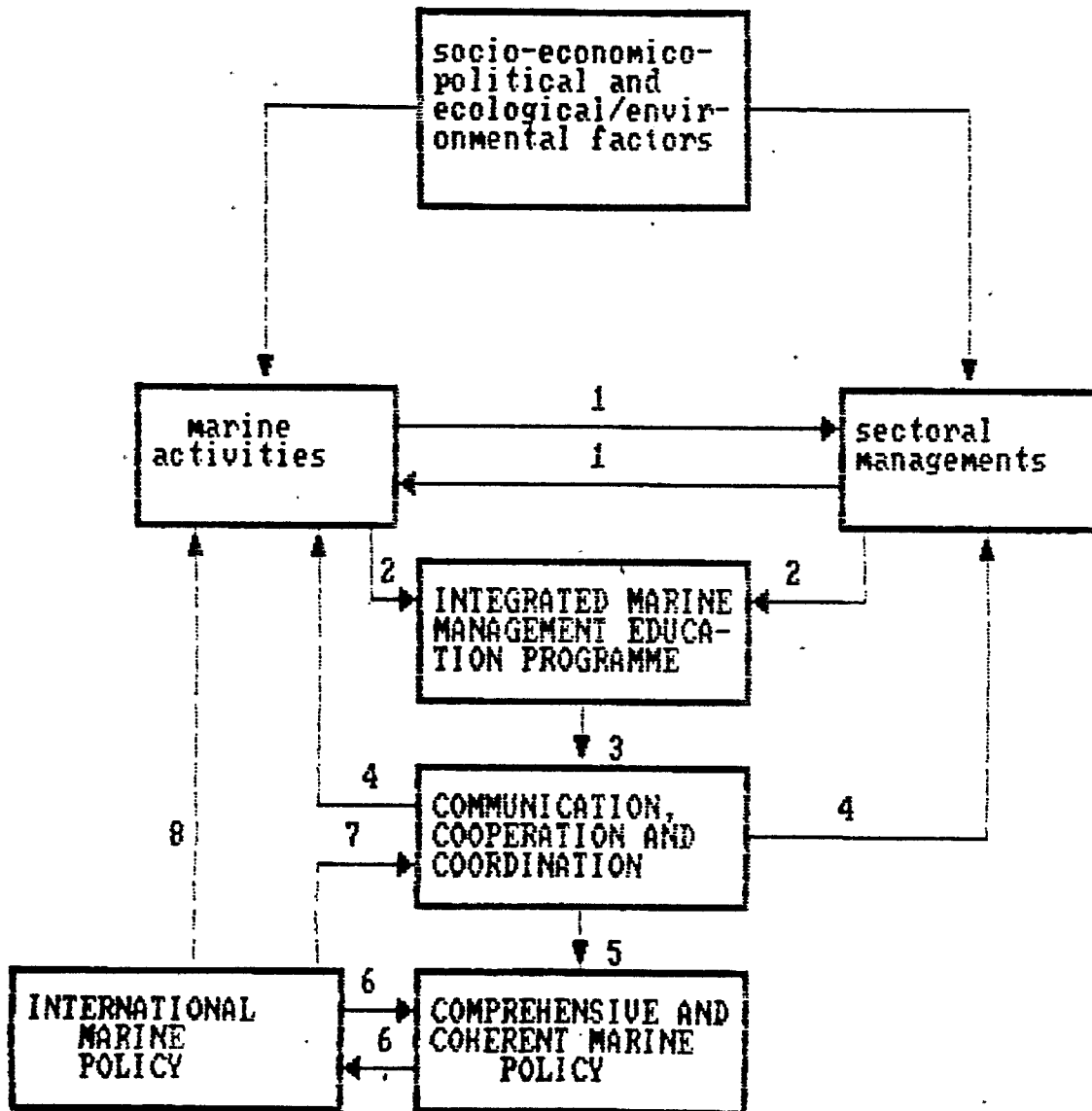
The Table (3.1) depicts the marine activities problems influenced by such factors as socioeconomic -political and ecological/environmental aspects which are linked to the sectoral managements (Link 1).

These problems can be integrated and filtered out by the programme (Link 2).

The filtering out of these problems give the result of communication, cooperation and coordination amongst the Department/personnel in the marine systems. Then a more comprehensive and coherent marine policy on both the national and international level will be emanated

# INTEGRATED MARINE MANAGEMENT EDUCATION PROGRAMME MODEL

TABLE 3.1



from this programme (Link 5).

In Table 3.2 we have two functions  $f(t)$  and  $g(t)$  representing marine activities and sectoral managements respectively which are described briefly below:

- STEP 1: Functions  $f(t)$  and  $g(t)$
- STEP 2: First differentiation of  $f(t)$  and  $g(t)$
- STEP 3: Result of differentiation  $f'(t)$  and  $g'(t)$
- STEP 4: Second differentiation of  $f(t)$  and  $g(t)$
- STEP 5: Result of differentiation  $f''(t)$  and  $g''(t)$
- STEP 6: Sum of  $f''(t)$  and  $g''(t)$
- STEP 7: Result of the sum  $f''(t) + g''(t)$  which is the inventory of the problems generated by the marine activities and sectoral managements.
- STEP 8: Methods (are communication, cooperation and coordination) used to solve the above problems.
- STEP 9: Suggestions and remedies which lead to a comprehensive and coherent marine policy both on national and international level.

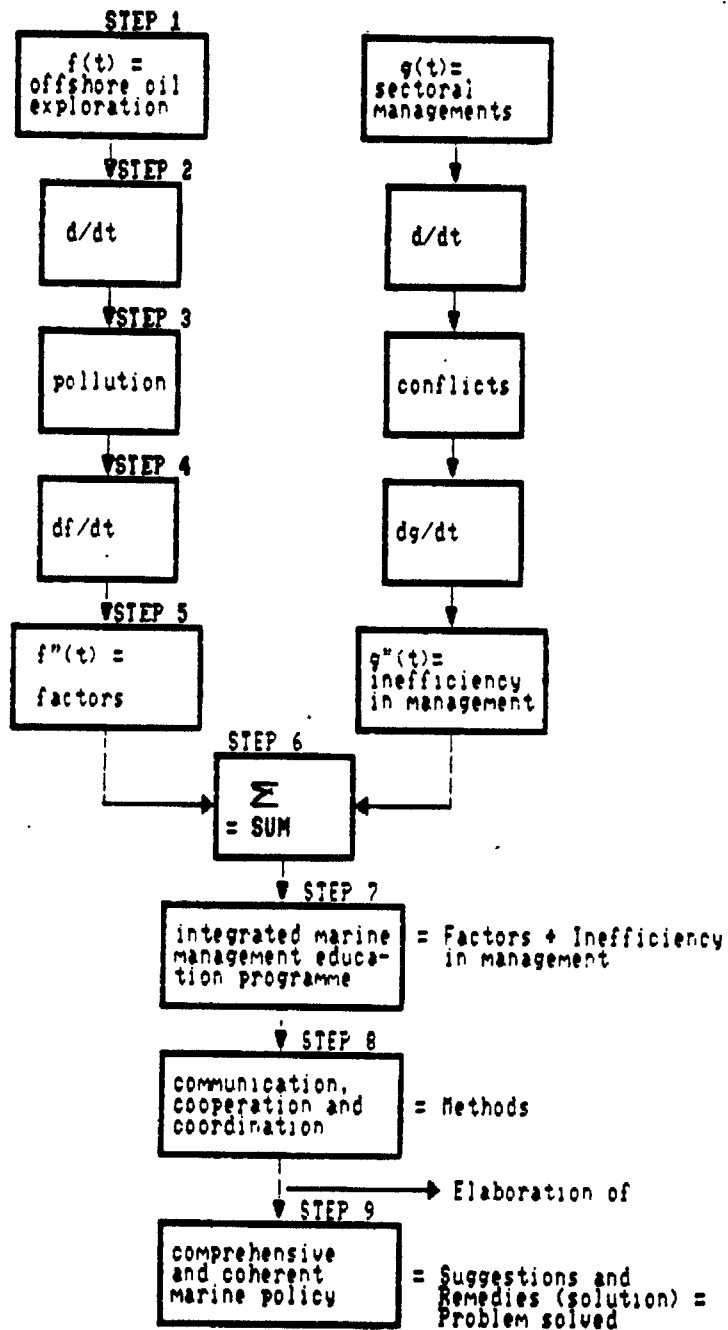
The programme can further be illustrated in mathematical form using the differential equation which has generating functions and integration which is the sum of the two functions as given below:

From Table 3.2, we find that the variable is  $t$  which is equals to time ( $t = \text{time}$ ) and the socio-economic-political factors and the ecological/environmental factors derived from the implications and effects on other users which are further derived from any marine activity.

For example, let assume the marine activity to be the

TABLE 3.2

MATHEMATICAL MODEL OF THE INTEGRATED MARINE MANAGEMENT PROGRAMME



offshore oil exploration:

Let pollution (is generated by offshore oil exploration) =  
 $df/dt$

$f(t)$  = offshore oil exploration

$f(t) = \text{pollution} = df/dt = f'(t)$

Let socio-economic-political and ecological/environmental  
factors (are generated by oil pollution) =  $df/dt = d/dt$   
 $(df/dt) = d^2f/dt^2 = f''(t)$ .

Again, let us assume the sectoral managements to be the  
Nigerian National Petroleum Corporation (NNPC):  $g(t)$

Let conflicts (are generated by sectoral managements) =  
 $dg/dt$

$g(t)$  = NNPC

$g(t) = \text{Conflicts} = dg/dt = g'(t)$

Let inefficiency, delay, frustration, indiscision and  
unsatisfactory compromises (are generated by conflicts) =  
 $dg/dt = d/dt (dg/dt) = d^2g/dt^2 = g''(t)$ .

In order to find the relationship between the function  
 $f(\text{offshore oil exploration})$  and its first and second order  
derivatives, we can use the second order differential  
equations having the form:

$$a f''(t) + b f'(t) + c f(t) = 0$$



where a, b and c are the parameters which can be constant or which can vary or depend on time (t) :

$$a = h(t)$$

$$b = e(t)$$

$$c = i(t)$$

In offshore oil exploration activity, one has to take the factors and inefficiency in management into consideration to elaborate a comprehensive, coherent marine policy. This mathematical approach can also be applied to all other marine activities such as aquaculture, shipping, ports and harbours, etc.

For teaching purposes, the above mathematical equation can be used and it is envisaged that with more work it can be applicable to the solving of oil pollution problems which might require additional oil companies and other experts inputs and point of views on the subject which are beyond the scope of this project.

The factors/problems influencing the marine activities and sectoral managements as earlier asserted are:

- a. socio- - unemployment; recreation on the beaches;
- economico- - tourism to coastal aesthetic areas,
- political - national income (GNP); employment,
- conflicts; rivalries and disagreements amongst the Departments/Personnel;
- institutional framework; planning and management,

- b. ecological/ - destruction of productive ecosystems  
environmental and depletion of fish species;  
polluted beaches; inadequate marine  
space; environmental marine pollution;  
erosion of land; ecosystems are damaged  
as a result of unplanned development;  
contamination of water around the marine  
environment.

Integrated marine management requires:

- . internal communication within the marine systems,
- . development of common understanding in the marine systems;
- . identification with respect to primary task of each Department/Personnel in the marine systems;
- . mutual trust, respect and mutual support amongst the various Departments/Personnel in the marine systems;
- . appropriate Departmental/Personnel skills and responsibilities in the marine systems;
- . selective marine activities of the Departments/Personnel in the marine systems;
- . management of differences amongst the various Departments/Personnel to remove rivalries in the marine systems; and
- . management information systems - connecting the sectoral managements with information flow of the Department/Personnel in the marine systems for operational/technical or commercial/financial or personnel indicators.

It also requires clear recognition and understanding of the importance of the various Departments/Personnel in the

marine systems such as:

- the facilities;
- activities;
- their responsibilities;
- conditions and jurisdiction they appropriate and operate, the decision or policy makers may fully utilize these resources for the benefit of the whole system.

One other area that is characterized with the marine systems is the area of Departmental/Personnel differences and rivalries. One Department/Personnel claims to be very important or above the other in the marine systems.

It is a well known fact that Departments/Personnel differ from each other, such as:

- in their areas of jurisdiction (depending on the laws and decrees establishing them);
- in their skills and potential;
- in their knowledge and research;
- in their capabilities (scientific and technological) such as the nature of job and specifications;
- in their experiences and expertise in special marine activities; and
- in their operational characteristics such as attitudes, values, benefits, systles and perception of reality.

These differences provide the essential ingredient sources for integration, better planning and management in order to develop and provide solutions for the problems of the marine systems managements as asserted in the previous

chapters and because there is no particular Department/Personnel that is too important or indispensable in the marine systems as a whole.

Departments/Personnel are complementary to one another.

### 3.2 Marine Affairs at the World Maritime University

The purpose of the marine affairs seminars and workshops at the World Maritime University is to foster communication, cooperation and coordination amongst countries in the areas of planning, management, conservation and protection of the marine environment as a component towards the achievement of the International Maritime Organization (IMO) objective: "Safer shipping and cleaner oceans" (C.P. Srivastava, 1989).

The World Maritime University has been chosen as the unique place for this type of programme on the global level in that the students of the institution are drawn from 133 member countries and one associate member of the IMO and in particular from the various segments of the marine systems such as maritime administrations, shipping companies, training colleges and similar institutions in the marine system as a whole.

The World Maritime University was established in July, 1983 by IMO in Malmo, Sweden for the purpose of providing higher education and training for senior personnel from both developed and developing countries who are involved in various maritime activities so as to be self-reliant and to promote global cooperation in the maritime field.

With the acquired knowledge in marine management and clear understanding of the possible conflicts such as misunderstandings, rivalries, etc, amongst departments/personnel in the utilization of the oceans and how they could be solved from the Marine Affairs programme at the World Maritime University, the graduates when they returned to their home countries would be capable to deal with resource identification and assessment of their marine environment (G. Zade , 1988).

The World Maritime University also serves as a global network which will provide regions of the world with centres for the implementation of short specialized model courses such as Marine Accident and Incident Investigation, MARPOL 73/78 - Annexes 1 and 11, Personnel Survival, Oil Tanker Familiarization, etc, and seminars developed by the IMO and other international organizations (WMU Newsletter, 1988).

### 3.3 Recent developments in support of ocean and coastal management in Canada, the Netherlands and Malta

The Governments of Canada, the Netherlands and Malta are actively involved in the transferring of ocean management skills to developing countries through the International Centre for Ocean Development (ICOD), the International Ocean Institute (IOI) and the Interdepartmental Coordinating Committee for North Sea Affairs (ICONA).

The Canadian Government established ICOD in 1985 to help developing countries get optimal returns from their newly acquired ocean space through the United Nations Law of the Sea Convention and with a projected budget of 58 million

Canadian dollars over the next five years, a 14-member Board of Directors (four from the developing countries) were mandated to :

- Initiate and support programmes in the developing countries for improved management and use of ocean resources, particularly for food production;
- Help countries develop their own expertise and institutions for integrated ocean-use management;
- Enlist the expertise of people and institutions in Canada and in the developing world;
- Develop and support the collection and dissemination of information on ocean development;
- Develop and sponsor training programmes , technical assistance projects, and advisory services for ocean resource development and management; and
- Support certain research programmes in ocean resource development (Ocean and Shoreline Management vol. 11, 1988).

The IOI was founded in 1972 in Malta to train civil servants and managers to deal with the complex issues of marine resource management and conservation. IOI focuses its efforts on issues arising from the United Nations Law of the Sea Convention and the EEZ.

These issues include policy-making and managerial concerns with emphasis on the economic, ecological, legal, and

technological aspects of fisheries, navigation, energy extraction and other ocean related endeavours, the role of international organization, national experiences in ocean management and managerial processes and techniques (Across the Oceans, January, July 1986).

In the Netherlands the Government has embarked on a course of increased coordination of North Sea policy. An Interdepartmental Coordination Committee (ICONA) was set up to ensure coordination between all ministries involved in North Sea issues. A general North Sea policy was developed which was further elaborated in a number of more detailed policy plans with regards to eg. water quality management and shipping.

### 3.4 Proposal for an integrated marine education programme

#### 3.4.1 General introduction

Since the promulgation of Decree No. 28 by Nigeria on the 2nd of October, 1978 which delimits the Exclusive Economic Zone (EEZ) of Nigeria to an area extending up to 200 nautical miles seaward from the coasts of Nigeria, the technological change, political and legal developments around the world have basically transformed the uses of the oceans, the role of the marine space and its resources.

When Nigeria promulgated the above decree, the belief was that through high scientific and technical programmes, she will reach the unattainable uses of the sea, and its resources because the sea still remains virtually untapped

and potentially can provide the resources badly needed for national development as already asserted in chapter one.

New marine sciences have opened new perspectives on the marine environment which have added new dimensions to the marine developmental strategy and with the provisions of the United Nations Conference of the Law of the Sea (UNCLOS 111), which confers Nigeria the exclusive rights over the fish and all other natural resources in the EEZ, if properly implemented and utilized would constitute the first building block of a new economic order in Nigeria.

#### 3.4.2 Concept of marine management education

The concept of marine management education with the emerging methodologies to calculate the contribution of the marine sector to the gross national product and new theories are all aiming at a synthesis between economy and ecology/environment.

This requires a new type of personnel and a new type of marine manager both in the natural and social sciences in the management of high technology, the management of the marine environment, and the management of the multinational human resources.

It is in this context that the integrated marine management education programme is being recommended and designed for personnel involved in marine systems in the areas of management and conservation of marine resources and uses.

This programme is designed to give participants an



overview of the many and varied aspects of EEZ management and to help them in the development of a familiarity with the broad range issues encountered in marine affairs. It attempts to increase awareness which is vital to the marine industry of the fact that marine management adds a new dimension to development strategy; that it requires broadly interdisciplinary skills, new institutional and legal infrastructures, and new forms of local, state, national, international, intergovernmental and nongovernmental organizations and cooperation.

The Rivers State University of Science and Technology, Port Harcourt is being recommended to be an ideal venue for this programme, given its historic and marine heritage as well as present reliance on the sea and its numerous programmes such as the Institute of Pollution Studies (IPS), Institute of Flood, Erosion, Reclamation and Transportation (IFERT), Marine Engineering, Fisheries Technology, Biological Sciences and the Institute of Agriculture Research and Training (IART).

There are no other institutions in the country that run such a programme that is being designed for departments/personnel involved in marine systems.

The programme devotes the first week to an introduction to oceanography, the idea being to show the interrelationships that exist across the globe and the marine activities, and the relevance of marine sciences to resource exploration, exploitation, conservation and protection.

During the second and third weeks, participants will

examine the United Nations Convention on the Law of the Sea, beginning with a general overview and continuing analyses of the provisions relevant to the programme, such as fisheries, oil and gas, marine transportation, etc; as well as related aspects of maritime law.

During subsequent weeks, the sectoral aspects of ocean management and development will be examined where the followings are treated: fisheries science and management; offshore oil and gas exploration, production, processing and transportation; management of the ports and harbours; maritime security and contingency planning and the development of health protection in the marine industry.

During the last 3 weeks the participants will examine specific aspects of planning and management, including socio-political aspects, the technical approaches and information systems and technology. The course will close with the development of an integrated management plan.

#### 3.4.3 THE OBJECTIVES OF THE INTEGRATED MARINE MANAGEMENT EDUCATION PROGRAMME

1. To develop an integrated approach to sea - use management that takes into account the various relationships between marine activities; between those activities and the marine environment on the one hand and general development strategy on the other;
2. To develop a more comprehensive and coherent sea policy on both the national and international level;
3. To bring better understanding of the interests and

responsibilities of the various Departments/Personnel with respect to monitoring the activities and relationships of the various marine activities;

4. To benefit industries involved in marine activities such as fleet operators engaged in the local rivers and creeks and other professional personnel who desire basic marine education while broadening their knowledge in marine sciences in connection with their current or projected employment goals; and
5. To provide the basis for advanced studies in marine management and marine affairs for future problems of life and needs of the marine industries.

#### 3.4.4 PARTICIPANTS

The programme is intended for both senior and mid-career civil servants from all government departments/branches involved in one way or the other in marine affairs (agriculture and fisheries, petroleum and energy, science and technology, shipping and navigation, ports and harbours, marine police, customs, navy, port health, tourism, environment, etc). The preferred age is 25 years and above with working experience.

#### 3.4.5 METHODOLOGY

The programme structure itself will reflect the methodology it attempts to convey to participants on marine resource management and marine policy making. This methodology will be based on:

- participative and problem-oriented lecturing;
- case method/studies;
- group session/discussion;
- field trips/escursions;
- simulation exercises by using the designed model;
- departments/personnel/country reports; and
- report presentation by participants.

#### 3.4.6 PARTICIPATIVE AND PROBLEM-ORIENTED LECTURES

Lecturers/Discussion leaders will be drawn from both indigenous and external (international) experts in marine fields. Many will come from international organizations including the United Nations and its many related bodies.

Participants will be organized in discussion groups. Each group by rotation will select the chairman and discussant for each discussion session.

#### 3.4.7 CASE METHOD/DISCUSSION

Case studies from Ecuador, the Netherlands, Indonesia, Mexico, India, Sierra Leone and others will be presented to analyse marine policy and management practices in those countries at different stages of development and with different economic interests, to assist participants in the preparation of their own presentation.

#### 3.4.8 FIELD TRIPS/ESCURSIONS

Participants will visit the most important sites of marine

enterprises in offshore oil, fisheries, aquaculture, etc, and the opportunity for discussions with managerial personnel.

There will be organized tours of the Nigerian Institute for Oceanography and Marine Research, Lagos, the Rivers State Ports Complex, the local fisheries facilities in Port Harcourt, and a possible cruise on an inshore fishing boat at the ocean fishing terminal, Port Harcourt.

#### 3.4.9 SIMULATION EXERCISE

The simulation exercise will be based on frictional case/case studies. There are four tasks as follow:

- Identification of uses conflicts at sea and on the coasts;
- Assessing the implications of these uses conflicts for each major use in turn;
- Establishing an order of priorities for dealing with conflits; and
- Providing an input into any developmental plan/project based upon the assessment of priorities. Any of the marine activities will be given to the groups to make assesment of priorities during the exercise. For example, if a port development plan is given, to provide inputs based upon the assessment of priorities, the procedual stages will be as follow:

**Stage 1:** Basic group intelligence work concentrating upon the four individual tasks;  
identification, assesment, establishment  
and provision of inputs;

- Stage 2: Establishment of inputs into the port development plan at group level;
- Stage 3: Plenary session; inter-group discussion on port development plan;
- Stage 4: Preparation of final Group report on port development;
- Stage 5: Presentation by individual groups of elements of port strategy; and
- Stage 6: Summing up; Establishment of basic elements and priorities of the overall port development plan within a sea use management frame work.

#### 3.4.10 DEPARTMENTAL/PERSONNEL/COUNTRY REPORTS

Each participant is required to prepare a departmental/personnel/country report related to:

- marine legislation in his/her department/country,
- institutional framework or arrangements: How are resources managed and regulated ? Which Government/Department/Personnel is responsible ? How is marine policy formulated ?,
- resource basis,
- Departmental/Regional cooperation mechanisms,
- contribution of the marine sector to GNP.

These reports will be presented and discussed during the final week of the programme.

Participants are required to bring with them the necessary background materials such as national legislation, national development plan, statistical data on the marine resources and Departmental/Personnel responsibilities and the decree/legislation establishing them.

#### 3.4.11 REPORT PRESENTATIONS

In addition to the individual Departmental/Personnel reports, participants will be required to prepare a group report incorporating the information presented during the entire programme, raising the major issues that have emerged, drawing conclusions and attempting some policy recommendations of their own.

### 3.5 SPECIFICATION OF COURSE MODULES

#### 3.5.1 INTRODUCTION TO OCEANOGRAPHY (2.5 DAYS)

- Geoscience of the ocean floor, hot vents, ocean floor minerals and mining;
- Differences between land and ocean geology;
- Research methods and costs;
- The ecology and geology of the coastal zone;
- Effects of tides and currents on sediment transport;
- Coastal sedimental, beach and shoreline types, coastal procedures, environmental coastal geology;
- Natural systems of the coastal zone: coral reefs, mangroves, etc.;
- Coastal hazards;
- Nearshore mining.
- Group session/Discussion.

#### 3.5.2 REGIONAL COOPERATION: THE ROLE OF THE COMPETENT INTERNATIONAL ORGANIZATIONS (2.5 DAYS)

- The role of International Maritime Organization (IMO): The IMO conventions on safety of navigation and the protection of the environment;
- The role of the Intergovernmental Oceanographic Commission and UNESCO;
- The role of the World Bank: How to finance ocean development projects;
- The international Union for Conservation of Nature (IUCN);
- The role of Food and Agriculture Organization (FAO);
- International Atomic Energy (IAEA);
- United Nations Environmental Programme (UNEP);
- UN Commission for Africa (ECA);



- United Nations Development Programme (UNDP).

### 3.5.3 THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (4 DAYS)

- A brief overview of developments leading up to UNCLOS 111;
- Analysis of the main provisions of the convention;
- Maritime Zones: Territorial Sea, Contiguous Zone, EEZ, Continental Shelf, High Seas;
- International Seabed Area;
- Limits of Maritime Zones;
- Provisions concerning the resources of the sea: Fisheries, Oil and Gas, Polymetallic Nodules, Sulphides and Crusts;
- The International Seabed Authority;
- The Common Heritage of Mankind;
- Provisions concerning other uses of the sea: Navigation, Energy, Artificial Islands and installations, etc;
- Other provisions: Archipelagic states, Landlocked states;
- Geographically disadvantaged states: Islands, Enclosed and Semi-enclosed seas;
- Marine scientific research;
- Conservation of marine environment;
- Transfer of marine technology;
- Dispute settlement: Boundary disputes, The experience of the International Court, New concepts emerging from the convention.
- Group session/Discussion

**3.5.4 MARITIME LAW; GROUP SESSION/DISCUSSION AND FIELD TRIP (4 DAYS)**

- Anatomy of international maritime transportation law;
- Legal aspects of ship owner and ship operation;
- Legal aspects of carriage of goods and passengers by sea;
- Legal aspects of navigation and safety of life at sea and marine pollution of the sea by ships;
- Marine insurance;
- Group session/Discussion;
- Field trip.

**3.5.5 FISHERIES SCIENCE AND MANAGEMENT (4 DAYS LECTURES AND 1 DAY SIMULATION EXERCISE)**

- The living resources of the sea: An overview of biological, economic, social, nutritional aspects;
- Fisheries Science: Biological and Environmental aspects;
- Fisheries Economics;
- Management of Fisheries;
- Fisheries Technology;
- Fisheries Surveillance;
- Simulation exercise.

**3.5.6 OFFSHORE OIL EXPLORATION, PRODUCTION, PROCESSING AND TRANSPORTATION (4 DAYS LECTURES AND 1 DAY SIMULATION EXERCISE)**

- General introduction: world wide energy demand and supply;
- Energy use projections: The prospects of offshore oil in Nigeria;

- Historical background of oil industry development in Nigeria;
- Basic oil and gas accumulation concepts;
- Oil and gas sedimentary rock accumulation;
- Geological concepts and principles;
- Geographical exploration methods;
- Manpower requirements for geophysical activities;
- Geological exploration methods: lithology, introduction of land-based drilling operations, drilling rig components and equipment;
- Communications: Rig positioning logistics, navigational, diver assist systems;
- Basic drilling procedures: Drill bits, Pipe, Drilling muds, Casing and cementing, Logging and testing;
- Simulation exercise.

#### 3.5.7. SHIPPING, MANagements OF PORTS AND HARBOURS; SIMULATION EXERCISE AND FIELD TRIP (4 DAYS LECTURES)

- Structures of the Nigerian shipping industry;
- Nigerian shipping regulation;
- Evaluation of economic and regulatory aspects of the Nigerian maritime policy;
- Issues in Nigerian international and inland shipping policy making;
- Potential impacts of cargo sharing on Nigerian shipping;
- Port administration, planning and development;
- Nigerian port policy, function and operation;
- Shipping and port development in developing countries;
- Inefficiency in port management;

- Lack of up-to-date loading and unloading technology;
- Failure to adjust to new integrated multi-modal systems of transportation have led to port congestion in many developing countries entailing tremendous losses in time and money and often spoilage of perishable goods;
- Vessel traffic management and navigational aid;
- Traffic congestion near ports;
- Simulation exercise;
- Field trip.

### 3.5.8. MARITIME SECURITY AND CONTINGENCY PLANNING FOR EMERGENCY RESPONSE (4 DAYS LECTURES AND 1 DAY SIMULATION EXERCISE)

- Security administration;
- Relevant international conventions, codes and recommendations;
- Responsibilities and functions of other involved organizations;
- Relevant government legislation and regulations;
- Risk, threat and vulnerability assessments;
- Security surveys and inspections;
- Ship security measures;
- Security training and education;
- Recognition of characteristics and behavioural patterns of persons who are likely to commit unlawful acts;
- Inspection, control and monitoring techniques;
- Techniques used to circumvent security measures;
- Dangerous substances and devices and how to recognize them;
- Ship and local port operations and conditions; and
- Security devices and systems;

- Simulation exercise.

### 3.5.9. THE DEVELOPMENT OF HEALTH PROTECTION IN THE MARINE INDUSTRY (2 DAYS LECTURES)

- International situation;
- Conventions and recommendations supported by ILO, WHO and IMO;
- The organization of Health Protection in the marine industry of Nigeria;
- General principles to guarantee Health Protection on board ships without a medical doctor.

### 3.5.10. COASTAL AND OCEAN PLANNING AND MANAGEMENT (4 DAYS LECTURES AND 1 DAY CASE STUDY)

- Principles of coastal and ocean planning and management;
- Uses and economics of coastal and ocean areas;
- Impact of development: safety issues; health issues; environmental issues;
- Planning and management techniques (zoning, special areas planning, uses of environmental impact assessments, physical planning, environmental planning, sectoral planning);
- Selected management procedures: case studies: consideration of 2 or 3 typical issues in tropical coastal and ocean management from developing countries (e.g. coastal oriented case study: tourism; waste disposal; aquaculture; ocean oriented case study: fisheries, offshore oil and gas, marine parks);
- Enforcement,
- Monitoring;

- Surveillance;
- Case studies.

### 3.5.11. MANAGEMENT INFORMATION SYSTEMS AND TECHNOLOGY; CASE STUDY (2DAYS)

- Problems and techniques involved in handling large amounts of information both of numerical and non-numerical character;
- File processing, searching and storing, information retrieval;
- File processing language, business systems and procedures;
- The meaning and role of MIS for managing, the management/organization system;
- Modern organization behavioural aspects of management;
- Information and the system approach;
- What the manager should know about computer, information system for decision making, planning and programming, management information system;
- Case study.

### 3.5.12. THE SOCIO-POLITICAL CONTEXT OF PLANNING AND MANAGEMENT (2.5 DAYS LECTURES; CASE STUDY AND COUNTRY REPORTS)

- Institutional building: structural and procedural issues;
- The policy-making process;
- The planning systems and implementation procedures;
- Limitations of current institutional arrangements, alternative institutional arrangements;
- Principles of administration;

- Organizational behaviour and management;
- Negotiation and conflict resolution;
- Case studies;
- Country reports.

### 3.5.13. DEVELOPMENT OF AN INTEGRATED MANAGEMENT PLAN

- An integrated management plan for Nigeria;
- An integrated management plan for a fictitious country.

#### NOTE:

.1. The simulation exercises are distributed along the courses and should be applied to the modules as appropriate. This intermingling of lectures and simulation exercises is envisaged to be of great benefit for the participants as well as the lecturers. The participants would be exposed to the theoretical and practical experience and the lecturers can design specific simulation exercises such as those tentative themes given in appendix 2 for their modules and adjust them to the lectures and vice-versa.

.2. The case studies and field trips are also included in between the course modules as appropriate. This would give a more practical orientation to the course together with other activities such as country reports, group discussions and report presentations.

### 3.5.14 DAILY SCHEDULE

There will be four sessions of one and a half hours

each, Mondays through Fridays. There may be some evening lectures on selected days.

The discussion leader/lecturer will be given about 45 minutes for his/her presentation in each of the sessions; and the remaining time will be reserved for general discussion.

The daily schedule will be as follows:

Session 1: 09:00 - 10:30

Break 10:30 - 10:45

Session 2: 10:45 - 12:15

Lunch 12:30 - 14:00

Session 3: 14:00 - 15:30

Break 15:30 - 15:45

Session 4: 15:45 - 17:15

### 3.5.15 EVALUATION

An appropriate questionnaire will be distributed to the participants before the closing session for programme evaluation and feedback.



### 3.5.16 SYNOPSIS

- Week 1: The sea around us: An introduction to oceanography and Regional cooperation: the role of the "competent international organizations".
- Week 2: The United Nations convention on the Law of the Sea.
- Week 3: Maritime Law.
- Week 4: Fisheries science and management.
- Week 5: Offshore oil exploration, production, processing and transportation.
- Week 6: Shipping, management of ports and harbours.
- Week 7: Maritime security and contingency planning for emergency response; The Development of Health Protection in the marine industry.
- Week 8: Coastal and ocean planning and management.
- Week 9: The socio-political context of planning and management; management information systems and technology.
- Week 10 Development of an integrated management plan and simulation exercise; evaluation and award of certificates.

### 3.6 FUNDING AND ESTABLISHMENT OF THE PROGRAMME

The Federal Government should allocate or make annual grants to the funding of the integrated marine management education programme.

At present, only one per cent of the Federal account is understood to be set aside yearly for solving ecological problems, an allocation considered grossly inadequate by experts who point out that an estimated 1.5 billion hectares of arable soil are being eroded annually, a figure that is only marginally less than what is being blown away by the wind (West Africa, 1989).

The Government of Portugal for example has recently decided to devote 30 per cent of its scientific research budget to the marine sciences. Also, recently, according to the report of the Third World Academy of Science in Trieste, Italy, the Academy was deeply concerned about the "science and technology gap" between the North and South, and suggested that every developing country must devote 4 per cent of its education budget to basic scientific research, 4 per cent to applied research, and another 10 per cent to Research and Development (E Mann Borgese, 1988).

Similarly, the Government of Nigeria should devote at least 30 per cent if not more of its scientific research budget to marine sciences in order to bridge the gap as asserted by the report of the Academy of Science and more so, the development of the marine sciences and of the concept of integrated ocean management is part of this

whole package.

The funding of the programme could also come from donations and scholarship schemes through the following international organizations:

- The World Bank;
- Intergovernmental Oceanographic Commission of the United Nations Education, Scientific and Cultural Organization (UNESCO);
- International Atomic Energy (IAEA);
- United Nations Environment Programme (UNEP);
- United Nations Development Programme (UNDP);
- Food and Agriculture Organization of United Nations (FAO);
- International Maritime Organization (IMO);
- International Union for Conservation of Nature and Natural Resources (IUCN);
- Economic Commission for Western Asia (ECWA);
- Economic Commission for Africa (ECA);
- International Centre for Ocean Development (ICOD);
- International Ocean Institute (IOI);
- United States Agency for International Development (USAID);
- Swedish International Development Agency (SIDA);
- Canadian International Development Agency (CIDA);
- Norwegian Aid for Development (NORAD);
- Interdepartmental Coordinating Committee for North Sea Affairs (ICONA), The Netherlands; and
- United Nations Office for Ocean Affairs and the Law of the Sea (OALOS).

In order to qualify for grants, the programme

administrators must reasonably demonstrate to the satisfaction that such grants which will be used or used to develop the integrated marine management programme is consistent with the requirements set forth in the proposal.

After making the initial grant, subsequent grant shall be made unless the programme administrators are satisfactorily developing or running such management training programme as specified in the proposal.

The cost to run and implement the programme have been broken down in the following:

	(\$)
1. Management programme development	50,000
2. Administrative cost	100,000
3. Allowance for lecturers	200,000
4. Travel	100,000
5. Equipment	50,000
	-----
	\$ 500,000
	-----

It is estimated that the cost of the project will be about five hundred thousand American dollars (\$500,000.000). The list of the equipment is given in appendix 3.

An Ad-hoc Task Force is needed to coordinate the programme when established.

## CHAPTER IV

### CONCLUSIONS

The basic purpose of this programme is to improve the analytic competence of the participants on issues relating to marine management, performance improvement, approaches, and strategic management techniques.

The Government should concern its self with the different activities occurring on the marine environment because the lack of awareness by the policy makers of the potentials and the interaction among activities in the marine environment in the past has created the marine management problems.

These interactions are necessary now since policies for individual sectors are not always independent for example the fisheries policy and the maritime policy (shipping, ports and harbours) are assumed to be unrelated but some times interrelated.

The programme will therefore present a blend of policy-making and managerial concerns, with emphasis on the economic/ecological, legal and technological macro-environment in which marine resource management has to function, as well as on the difference managerial processes and alternatives at the macro-level.

All these are aimed at bring the various personnel in the marine systems to the growing awareness of the need to develop better approaches to sea management and a

comprehensive and coherent sea policy on both the national and international level through training and familiarization of marine sciences, advanced marine management and marine affairs.

An Ad-Hoc Task Force is recommended to coordinate the programme.

## BIBLIOGRAPHY

1. Across the Oceans, The International Ocean Institute Newsletter January, July 1986 pp. 1 - 22.
2. Ajayi, T.O (1984): A review of 1973 - 1982 Tuna Fishing Activities within Nigeria's EEZ and options for Nigeria, Technical paper No. 16 NIOMR, Lagos July 1984
3. Baker, Jenifer M (1983): Mangrove swamps and the oil industry, oil and petrochemical pollution, Graham and Trotman, 1983.
4. Bereiweriso, L.O.F (1985): New maritime policy and its effect on Nigeria; March 1985 Seaways. pp. 12-15.
5. Bob-Manuel, K.D.H (1987): Acting Head of Marine Engineering Department, Rivers State University of Science and Technology, Portharcourt, Nigeria; "Training of Marine Engineers at the Rivers State University of Science and Technology and the Role Marine Engineers in National Development"; A paper presented at the International Seminar on Maritime Safety Education and Training in Nigeria, 17th December, 1987. pp. 3.
6. Brundtland Bulletin (1988): The "Brundtland" report; A year later, September 1988, a publication by the Centre for our Common Future.
7. Chidi, Ibe. A (1982): "A review of potential economic mineral resources in offshore Nigeria"; NIORM Tech.



Paper No. 8, Lagos, 1982, pp. 20.

8. Daily Times: Thursday June 23 1988 pp. 3.
9. Economic Commission for Africa (1987): A recommendation of the Expert Group Meeting on Acquisition of Marine Science and Technology - Addis Ababa, October 1987, pp.50.
10. ICC International Maritime Bureau (1986) pp. 239.
11. International Maritime Organization Treaty Status, 1988.
12. Kullenburg, G (1988): Secretary and Head, Marine Pollution Research and Monitoring Unit, IOC (UNESCO); Lecture notes on the Scientific Background to Global Conventions, London Dumping Convention and MARPOL 1973/78
13. Lloyd's List International: June 1, 6 and 15, 1988.
14. Mann Borgese, E (1988): Chairman, International Ocean Institute; A letter sent in response to sponsoring and funding of the Integrated Marine Management Education Programme, 1988.
15. McCabe, D (1986): Simulation and Games in Teaching and Learning, Teaching Methodology Papers Hong Kong Polytechnic Education Unit, Hong Kong 1986.
16. National Population Bureau (1978): The projection of

Nigerian population for the year 2,000.

17. Newswatch July 18, 1988.
18. Neziyana, C (1986): "Problems of Development and Management of Ocean Resource", a thesis of the World Maritime University, 1986.
19. Obasanjo, O (1978): Head of State and Commander of the Armed Forces, Military Government of the Federal Republic of Nigeria; Exclusive Economic Zone Decree (Decree No. 28) 1978.
20. Ocean and Shoreline Management Volume 11 No. 1, 1988 pp. 91 - 93.
21. Peet, G (1988): Netherlands Institute for the Law of the Sea (NILOS) of the University of Utrecht and S.E.A. Foundation, Delft; "North Sea Management in the Netherlands" lectures notes, 1988.
22. Singh, J and Chan, C.F (1988): Micro processor and Simulators: "What contribution can they make to efficiency and effectiveness of training of shipboard personnel"; A seminar paper of the International Conference on Maritime Education and Training (International Maritime Lecturers Association), 1988 pp. 3.
23. Srivastava, C.P (1989): Secretary-General of the International Maritime Organization, "Safer Shipping and Cleaner Oceans"; thirty years' work of the International Maritime Organization - Transport Review

1989 Volume 9, No.1. pp. 45-57.

24. The Statistics of Nigeria Fish Production by Industrial Sector for 1978 to 1985; A publication of the Federal Department of Fisheries.
25. Tukur, B.M (1982): General Manager, Nigerian Ports Authority; "The role of Nigerian Ports Authority in the futherance of both ocean shipping and national trade functions in the national development"; Proceedings of the First national conference of the Nigerian Shippers, 1982 pp. 19-25.
26. UNEP (1982): Report of Meeting of the Steering Committee for the Marine Environment of West and Central Africa, Geneva, 22 - 23 April 1982; UNEP/WG .72/3, pp. 39.
27. UNEP Regional Seas Reports and Sudies No. 27 (1983): "The Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of West and Central African Region", Abidjan, 16 - 23 March, 1981.  
  
UNEP Regional Seas Reports and Studies No. 46 (1984): "The Marine and Coastal Environment of West and Central African Region and its state of pollution".
28. UN General Assembly Resolution XXVII of 15 December 1972.
29. West Africa: March 6 - 12, 1989, pp. 370.  
  
West Africa: June 20, 1988, pp. 1108.

West Africa: July 18, 1988.

West Africa: June 5 - 11, 1989. No. 3746.

West Africa: August 14-20, 1989.

30. WMU Newsletter (1988): The World Maritime University Newsletter No. 3, December 1988. pp. 1 - a quarterly publication.
31. World Bank population estimate, 1983.
32. World Fertility Survey, 1981/82.
33. Worldmark Encyclopedia of Nations, Africa, publisher - Worldmark Press, LTD. pp. 242.
34. Zade, G (1988): Vice-Rector and Academic Dean, World Maritime University; "Address to Graduation 1988" pp.2.

APPENDIX

1. CONVENTIONS, PROTOCOLS, AMENDMENTS AND CODES NOT  
RATIFIED AS OF DECEMBER 1988

- .1. International Convention for Safe Containers (CSC),  
1972 as amended (CSC 1972);
  - 1981 Amendments to Annex 1;
  - 1983 Amendments to Annexes 1 and 11
- .2. International Convention on Maritime Search and  
Rescue, 1979 (SAR 1979);
- .3. Special Trade Passenger Ships Agreement, 1971 (STP  
1971);
- .4. Protocol on Space Requirements for Special Trade  
Passenger Ships, 1973 (SPACE STP 1973);
- .5. Protocol of 1978 Relating to the International  
Convention for the Prevention of Pollution from Ships,  
1973, as amended (MARPOL PROT 1978);
- .6. - 1984 Amendment;
- .7. - 1985 (PROTOCOL 1) Amendments 1973/78;
- .8. - 1985 (ANNEX 11) Amendment 1973/78;
- .9. - 1987 (ANNEX 1) Amendments;

- .10. Load Line Amendments 1971 - Resolution A.231 (VII);
- .11. Load Line Amendments 1975 - Resolution A.319 (IX);
- .12. Load Line Amendments 1979 - Resolution A.411 (XI);
- .13. Load Line Amendments 1983 - Resolution A.513 (13);
- .14. International Convention Relating to Intervention on the High Seas in case of Oil Pollution Casualties, 1969 (INTERVENTION 1969);
- .15. Protocol Relating to Intervention on the High Seas in cases of Pollution by Substances other than Oil, 1973 (INTERVENTION PROT 1973);
- .16. Protocol to the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1976);
- .17. Protocol of 1984 to amend the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1984);
- .18. Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1976);
- .19. Protocol of 1984 to amend the International Convention on the Establishment of International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1984);

- .20. Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971 (NUCLEAR 1971);
- .21. Athens Convention Relating to the Carriage of Passengers and their Luggage by Sea, 1974 (PAL 1974);
- .22. Protocol to the Athens Convention Relating to the Carriage of Passengers and their Luggage by Sea, 1974 (PAL PROT 1976);
- .23. Convention on the Limitation of Liability for Maritime Claims 1976 (LLMC 1976);
- .24. Convention on the International Maritime Satellite Organization (INMARSAT) (INMARSAT C);
  - 1985 Amendments;
- .25. Operating Agreement on the International Maritime Satellite Organization (INMARSAT) (INMARSAT OA);
  - 1985 Amendments;
- .26. Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, 1972, as Amended (LDC 1972)
  - 1978 (INCINERATION) Amendments;
- .27. - 1980 Amendments;
- .28. IMDG CODE.

2.

SIMULATION EXERCISE  
(TENTATIVE THEMES)

- .1. Assessment of internal and external maritime trade;
- .2. Assessment of shipping requirements and marine traffic;
- .3. Development of a navigation management system;
- .4. Specification of a design of a port;
- .5. General requirements of port management;
- .6. Resource assessment;
- .7. Development of a shore industry and commercial markets;
- .8. Assessment of waste disposal requirements and pollution hazards;
- .9. Maximisation of marine and coastal recreation potential; and
- .10. Identification of conservation requirements in relation to all other uses.



3.

TEACHING FACILITIES AND EQUIPMENT

<u>QTY.</u>	<u>EQUIPMENT DETAIL</u>	<u>COST (\$)</u>
2	VIDEO MACHINES	4,000
24	VIDEO CASSETTS	1,000
2	OVERHEAD PROJECTORS	3,000
200	OVERHEAD TRANSPARENCIES	1,000
1	PERSONAL COMPUTER (PC)	5,000
1	PRINTER	1,000
1	SET OF WRITING MATERIALS AND STATION	20,000
1	BOOK SHELF FOR STORAGE OF MANUALS AND PUBLICATIONS	1,000
1	SLIDE PROJECTOR	1,000
1	16 mm FILM PROJECTOR	2,000
1	SET OF SLIDES SHOWING	1,000
1	SET OF CASSETTES OR FILMS	2,000
-----		
	TOTAL	50,000
-----		

Ordinary class room facilities, overhead projectors and audiovisual materials are sufficient for teaching purposes.

4.

ANALYSIS OF IMPLICATIONS/EFFECTS

A simple program is being developed using a basic language which when completed will be used during the simulation exercises. The program will list all the marine activities with their possible implications and effects on other users.

Computer Algorithm:

- .1. Read in marine activities;
- .2. Select one marine activity;
- .3. Take the value of an activity and read in implications
- .4. Select one implication;
- .5. Take the value of one implication and print out effects.

```

20 REM Smal Expert System
30 KEY OFF
40 N=15:N1=15:N2=11:N3=13
50 DIM A1(N),A2$(N),A3(N),A4(N,N1)
60 DIM IP(N2),IPM$(N2),IPQ(N2),IPQQ(N,N2)
70 DIM TEXT$(N,N1)
80 DIM EFF(N3),EFFT$(N3),EFS(N3)
90 CLS
100 REM ACTIVITIES
110 FOR N=1 TO 13
120 READ A1(N),A2$(N),A3(N)
130 FOR N1=1 TO A3(N)
140 READ A4(N,N1)
150 NEXT N1
160 NEXT N
170 PRINT "MARINE ACTIVITIES"
180 PRINT
190 FOR N=1 TO 13
200 PRINT N;" ";A2$(N)
210 NEXT N
220 PRINT : PRINT : PRINT " select ";
230 INPUT Q
240 PRINT
250 CLS
260 REM implications
270 PRINT "IMPLICATIONS"
280 PRINT
290 FOR N=1 TO N2
300 READ IP(N),IPM$(N),IPQ(N)
310 FOR N1=1 TO IPQ(N)
320 READ IPQQ(N,N1)
330 NEXT N1
340 NEXT N
350 FOR N1=1 TO A3(Q)
360 PRINT A4(Q,N1),IPM$(A4(Q,N1))
370 NEXT N1
380 PRINT : PRINT : PRINT " select ";
390 INPUT Q
400 PRINT
410 CLS
420 REM effects
430 PRINT "E F F E C T S "
440 FOR N=1 TO N3
450 READ EFF(N),EFFT$(N),EFS(N)
460 'PRINT EFF(N),EFFT$(N),EFS(N)
470 FOR N1=1 TO EFS(N)
480 READ TEXT$(N,N1)
490 NEXT N1
500 NEXT N
510 FOR N1=1 TO A3(Q)
520 PRINT A4(Q,N1),EFFT$(A4(Q,N1))
530 NEXT N1
540 PRINT : PRINT : PRINT " select ";
550 INPUT Q
560 PRINT
570 CLS
580 PRINT "E F F E C T S"
590 PRINT
600 FOR N1=1 TO EFS(Q)
610 PRINT TEXT$(Q,N1)

620 NEXT N1
630 A$=INKEY$ :IF A$="" THEN 630
640 RESTORE
650 GOTO 90

```

SEA FISHERIES DECREE 1971  
(1971 No. 30)

Sea Fisheries (Fishing) Regulation 1972.  
Commencement: 15th August, 1972

In exercise of the powers conferred by section 11 (1) of the Sea Fisheries Decree 1971, and of all other powers enabling me in that behalf, I, Josiah Onyebuchi Johnson Okezie, hereby make the following Regulations:-

1. No vessels (except canoe) shall fish within the first two nautical miles of the waters of the Nigerian continental shelf. Restriction on fishing in certain area etc.

2. Trawlers shall not use a codend with stretch mesh size of less than 3 inches (76mm) when trawling for fish in the inshore waters or less than 1¼ inches (44mm) when trawling for shrimps in areas approved for shrimp trawling.

3. No shrimp trawling is permitted in the inshore waters of the Lagos-West Fishing grounds. Shrimp trawling.

4. - (1) Fishing vessels licensed to fish in the territorial waters of Nigeria must not dump edible and marketable sea products at sea. Accordingly, fish landed by shrimp trawlers must not be less than 75 per cent by weight of the total landings including the head-on weight of the shrimps landed. Dumping of edible and marketable Sea Product and Export thereof.

(2) All the catch must be landed at port and no part of it may be exported or shipped away from Nigeria at sea.

(3) Any part of the catch for export shall be exported in the usual manner and subject to any foreign exchange regulations for the exportation of such commodities from Nigeria.

5. - (1) Any person who contravenes or fails to comply with any of the provisions of these regulations shall be guilty of an offence and be liable to a fine of £100 or to imprisonment for six months or to both such fine and imprisonment.

(2) Where an offence under these regulations which has been committed by a body corporate is proved to have been committed by the consent or connivance of, or be attributable to any neglect on the part of any Director, Manager, Secretary or other similar Officer of the body corporate, or any person who was purporting to act in any such capacity, he, as well as the body corporate shall be guilty of that offence and shall be liable to be proceeded against and punished accordingly. Interpretation.

6. In these regulations -

"the inshore waters" is a reference to that part of the continental shelf with depth not more than 50 metres (27 fathoms);

B 170 "the Lagos-West Fishing grounds" is a reference to that area of the continental shelf adjacent to the Lagos and Western States: "shrimp" includes prawns and other similar edible crustacea and

"the territorial waters of Nigeria" has the meaning assigned thereto in section 1 of the Territorial Waters Decree 1967"

Citation 7 These Regulations may be cited as the Sea Fisheries (Fishing Regulations 1972).

J. O. J. Okezie  
Federal Commissioner for  
Agriculture and Natural Resources.

#### EXPLANATORY NOTE

(This note does not form part of the Regulations but is intended to explain its effect)

The Regulations, among other things, prohibit fishing by vessels (except canoes) in certain areas of the Nigerian Continental Shelf and also restrict trawling for shrimp in the inshore-waters of Lagos-West Fishing grounds.