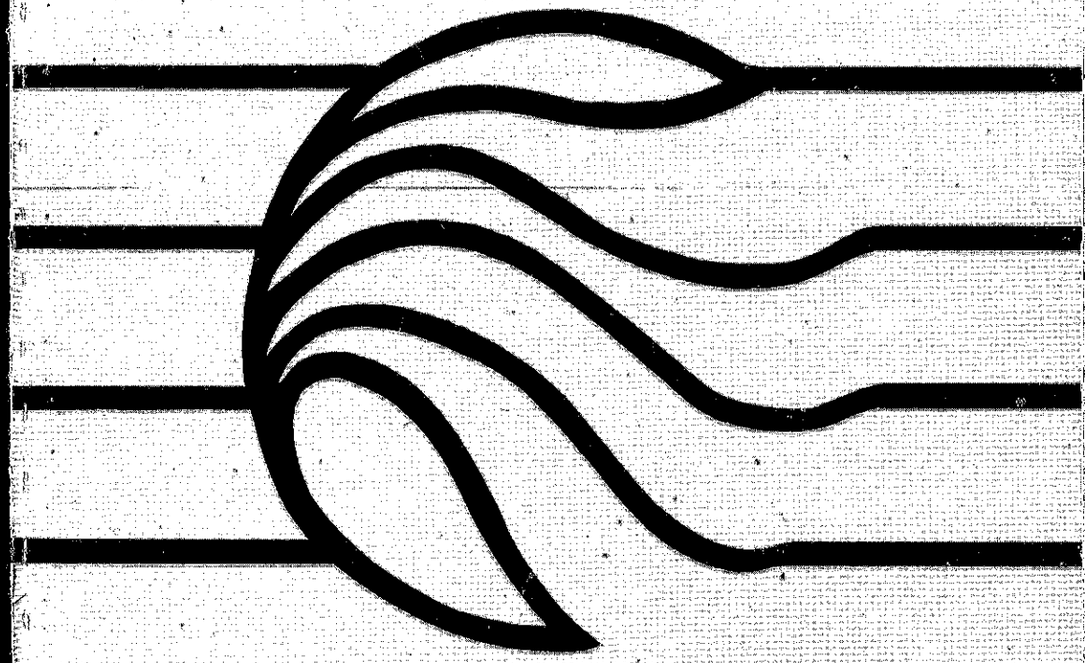
NATURAL DISASTER REDUCTION IN NIGERIA



A Report by the National Committee on the International Decade for Natural Disaster Reduction (IDNDR).

May, 1994

NATURAL DISASTER REDUCTION IN NIGERIA

A REPORT BY THE NATIONAL COMMITTEE ON THE (IDNDR) TO THE WORLD CONFERENCE ON NATURAL DISASTER REDUCTION, YOKOHAMA, JAPAN, 23 - 27 MAY, 1994.

NATURAL DISASTER REDUCTION IN NIGERIA

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National Agency for Science and Engineering Infrastructure (NASENI)	"
Federal Ministry of Health and Human Services	"
Federal Ministry of Information and Culture	"
Federal Ministry of Agriculture, Water Resources and Rural Development	"
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National Emergency Relief Agency (NERA)	"
Nigeria Security and Civil Defence Corps	"
Nigerian Industrial Development Bank (NIDB)	"
National Insurance Company of Nigeria (NICON)	"
Nigerian Red Cross Society	"
Nigerian Television Authority (NTA)	"
Federal radio Corporation of Nigeria (FRCN)	"
Federal Environmental Protection Agency (FEPA)	Secretariat

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FOREWORD

Natural disasters occur in all parts of the world, although their nature, intensity and impact vary from country to country. In Nigeria the major natural disaster phenomena include tropical storms, land erosion, floods, drought, desertification, human diseases, coastal erosion, windstorms, livestock diseases, plant pests and diseases, wildfires and harmattan haze.

Because of the seriousness of the exposure of Nigerians to these natural hazards, the government of Nigeria subscribes fully to concerted international action for the reduction of disasters arising from them. Thus, with the adoption by the United Nations General Assembly of the years 1990 to 2000 as the International Decade for Natural Disaster Reduction (IDNDR), Nigeria established a National Committee for the International Decade for Natural Disaster Reduction. The main task of the Committee is to plan and co-ordinate activities related to the objective and goals of the Decade. The overall objective of the Decade is:

> *to reduce through concerted international action, especially in developing countries, the loss of life, property damage and social and economic destructions caused by volcanic eruption, wildfires, grasshopper and locust infestations, drought and desertification and other calamities of natural origin.*

The goals of the Decade are:

i. to improve the capacity of each country to mitigate the effects of natural disasters expenditiously and effectively with special attention to assisting developing countries in:

a) the assessment of disaster damage potential;

b) the establishment of early warning systems; and

c) the establishment of disaster - resistant structures when and where needed;

ii. to devise appropriate guidelines and strategies for applying existing scientific and technical knowledge taking into account the cultural and economic diversity among nations;

iii. to foster scientific and engineering endeavours aimed at closing critical gaps in knowledge in order to reduce loss of life and property;

iv. to disseminate existing and new technical information related to measures for the assessment, prediction and mitigation of natural disasters; and

v. *to develop measures for the assessment, prediction, prevention and mitigation of natural disasters through programmes of technical assistance and technology transfer, demonstration projects, education and to evaluate the effectiveness of these programmes.*

In pursuit of these objectives, the National Committee has established five Sub-Committees.

i. Desertification, Drought and Wilfires
ii. Erosion, Landslides and Earthquakes;
iii. Flood, Wind and Rainstorms;
iv. Epidemics and Pest Invasion;
v. Information and Public Enlightenment;

as well as a Working Group on Natural Disaster Reduction. The objectives of the latter are:

i. *to articulate a national report for presentation at the 1994 World Conference on Natural Disaster Reduction; and*
ii. *to evolve a national plan of action for natural disaster reduction in Nigeria.*

This volume has been put together by the Working Group on behalf of the National Committee. It is a situation report on natural disaster reduction in Nigeria and a first step in the evolution of a national action plan.
I should like to express the gratitude of the National Committee on the IDNDR to the Working Group for putting the report together.

J. O. Olatunji
Chairman,
Nigeria National Committee for the IDNDR

PREFACE

Concerned by the adverse effects that natural disasters have on the lives of a large number of people and on infrastructure and property world-wide and especially in developing countries, the United Nations General Assembly proclaimed the 1990s the International Decade for Natural Disaster Reduction (IDNDR). The objective of the IDNDR is to reduce, through concerted international action, especially in developing countries, the loss of life, property damage and economic and social disruption caused by natural disasters, such as earthquakes, windstorms, tsunamis, floods, landslides, volcanic eruptions, wildfires, grasshopper and locust infestation, drought and desertification and other calamities of natural origin.
Nigeria quickly identified with this objective by establishing in 1990 a National Committee on the IDNDR to co-ordinate the Decade's activities in the country. Based in the Presidency with the Federal Environmental Protection Agency (FEPA) as its Secretariat and focal point, the main task of the multi-disciplinary and cross-sectoral Committee is to plan and co-ordinate activities related to the objective and goals of the Decade with the following areas of concentration:

i. identification of hazards zones and hazard assessment;
ii. monitoring, prediction and warning on hazards;
iii. short-term protection measures and preparedness:
iv. long-term preventive measures against natural hazards;
v. land use and risk management;
v. public education and information.

Among activities embarked upon by the National Committee is the formulation of a national plan of action on natural disaster reduction. Towards achieving this the Nigeria Working Group on Natural Disaster Reduction was inaugurated by Government with the following Terms of Reference:
For each of the priority disaster phenomna in Nigeria, including drought, desertification, erosion, landslides, floods, wildires, tropical storms, pest invasion, disease epidemics, earth tremors and volcanoes:

a) *to undertake a brief historical review of the phenomenon in Nigeria;*
b) *to appraise available information on the hazard, including vulnerability assessment (maps, data etc.);*

c) *to substantiate the existence of relevant forecasting and early warning systems;*

d) *to compile concise information on prevention and mitigation activities completed, on-going or planned;*

e) *to propose an appropriate framework for emergency response at Federal, State and local levels; and*

f) *to sketch a disaster management strategy;*

This volume is a situation report on natural disaster reduction in Nigeria. Compiled by the National Working Group on Natural Disaster Reduction, it has been prepared for the World Conference on Natural Disaster Reduction to be hosted by the government of Japan and slated for 23-27 May, 1994. Being the first such report for Nigeria, it gives the nature and character of the wide range of disaster - producing natural hazards confronting the various parts of the country as well as the vulnerability to them of the population, infrastructures, socio-economic systems and development efforts. It also sketches the nature and status of existing mitigation activities and warning systems. The status of international co-operative efforts in achieving IDNDR goals are reviewed. Finally an over-all evaluation and future programme of IDNDR activities in the country is given.

Dr. Evans O. A. Aina
Director General/ Chief Executive
Federal Environmental Protection Agency

ENVIRONMENT AND DEVELOPMENT INDICATORS

Capital: Abuja.
Total area: 923,770 sq. km.
Coastline: 853 km.

Population: (1991) Provisional Census).
Total: 88.5 million. **Male:** 44.5 million. **Female:** 44.0 million. **Under 15 yrs:** 43%. **Urban:** 30%. **Rural:** 70%. **Lagos:** 5.7 million. **Cities > 500,00:** 12. **Birth Rate**: 49/1,000. **Death Rate:** 16/1,000. **Infant Mortality:** 82/1,000. **Life Expectancy**: 48 years.

Climate.
Rainfall: **South:** 1,000 mm, **North:** 500-1,000 mm. **Min. temperatures:** 20^0 - 25^0C. **Max. temperatures:** 28^0 - 32^0C

Economy.
GNP: US$23.7 billion. **GNP per capita:** US$268. **GDP structure (%):** Agriculture: 31.6% Petroleum: 29.8%. Services: 26.3% Manufacturing: 8.6%. Indirect taxes: 2.3%, Construction: 1.4% **External debt:** US$33.4 billion (1991).

Foreign trade and investment.
Main Imports: Medicines, vehicles, sugar, stockfish, cement. **Main Exports:** Crude petroleum, cocoa, palm kernel, tin metal, rubber. **Terms of trade:** Declining. **Net flow of public external capital:** Negative. **Net flow of private external capital:** Negligible. **Net direct private investment:** Negligible.

Government expenditure.
Total: US$ 4.1 billion **Defence**: 5.42.% **Education:** 8.3% **Housing and social services**: 14.8% **Economic services**:11.8%. **Others** : 1.4%

Energy.
Consumption per capita: 263 kg coal equiv.

Employment.
Working age (15-64 years): 57%. **Agriculture:** 60% **Industry:** 13%. **Services:** 10% **Distribution:** 17%.

Infrastructure.
Roads: 150,000 km. **Railway:** 3,013 km **Radios**: 10 million. TV: 2 million. **Telephones**: 483,496 (1989).

Education.
School enrolment: Primary: 12.8 million. **Secondary:** 3.1 million. **University**: 174,000. **Iliteracy**:40%

Health.
Doctors: 19,042. **Nurses:** 126,400. **Hospital beds**: 104,732. **Access to drinking water: Urban:** 46%, **Rural:** 20%.

Agriculture.
Cropland: 34%. **Pasture:** 23% **Forest and woodland:** 16%. **Settlements and infrastructure**: 17%. **Main crops**: cocoa, oil palm, maize, cotton millet sorghun, wheat, cassava, yam, groundnuts, roots and tubers.

Forestry.
Forest and woodland: 9.6 million ha. **Annual deforestation,** 1980s: 350,000 ha. **Annual reafforestation,** 1980s: 30,000 ha. **Annual fuelwood and charcoal production:** 55 million m^3 **Annual roundwood production:** 8 millions m^3

Protected areas:
National Parks: 4.
Special Reserves: 35

Biological diversity.
Plant species: 4,600. **Mammals:** 274. **Birds:** 839. **Frogs and toads:** 109. **Snakes:** 110. **Insects:** 20,00. **Endangered plants:** 484. **Endangered animals:** 20.

Exchange rate:
18.4 Naira = US $1.00 (May, 1992).

Sources: Nigerian government and World Bank reports. All figures are for 1987-88 unless indicated otherwise.

1. EXECUTIVE SUMMARY

1.1. Risk assessment.

1.1.1. The main natural hazards which produce disasters in Nigeria, in rough order of priority are tropical storms, land erosion, floods, drought, desertification, human diseases, coastal erosion, windstorms, livestock diseases, plant pests and diseases, wildfires, harmattan haze and landslides. In addition, there are natural hazards which have the potential, more or less remote, of producing disasters. They include earthquakes and volcanoes.

1.1.2 Apart from landslides, which are localized in occurrence, and desertification, coastal erosion and volcanoes, which have regional distribution patterns, these natural hazards have a widespread distribution in the country.

1.1.3. The pattern of vulnerability of people and infrastructures follows very roughly the pattern of distribution of the natural hazards. Thus, for most of the hazards, either the entire population of the country or a very substantial part of it is potentially at risk in terms of lives, livelihoods and social infrastructures.

1.2. Mitigation Activities.

1.2.1. Activities designed to mitigate natural disasters in Nigeria include:

i. those designed to meet the challenges of specific natural hazards, namely, land erosion, floods, drought and desertification, human diseases, coastal erosion, windstorms, livestock diseases, wildfires, harmattan haze and earthquakes, and

ii. those forming broad-based frameworks for pre-occurence and post- occurrence response to natural disasters. These include landuse planning, water management, forest management, preparedness and planning and awareness campaigns.

1.2.2. In the area of preparedness and planning, Nigeria has in place a number of governmental outfits and NGOs which provide emergency response whenever there is a natural disaster.

1.3. Warning.

1.3.1. Warning systems for meteorologically-related natural hazards are poorly developed in Nigeria.

1.3.2. Warning systems for earth tremors are being developed.

1.3.3. Warning systems for biologically-related natural hazards are fairly well-developed.

1.3.4. Warning systems for desertification are yet to be developed.

1.4. International Co-operation

1.4.1. Nigeria's international co-operation efforts in fulfilling the IDNDR objective and goals include:

i. Effective contact with the DHA and the IDNDR Secretariat;

ii Bilateral co-operation with other countries both within and outside Africa;

iii. Regional and Sub-regional co-operation to tackle cross-border disaster situations; and

iv. Receipt of disaster - specific assistance from UN and other agencies.

1.5. Overall Evaluation and Future Programme of IDNDR Activities

1.5.1. Some progress has been made towards the achievement of the objective and goals of the IDNDR in the areas of:

i. Identification of natural hazards;

ii. General assessment of vulnerability of people and resources to these hazards;

iii. Putting in place of emergency response outfits;

iv Establishment of institutions and agencies to warn on the occurrence of natural disasters; and

v. Raising community awareness of some natural hazards.

1.5.2 A great deal remains to be done in the second half of the Decade in the areas of:

i. Hazard assessment;

ii. Warning; and

iii. Preparedness

1.5.3 The most important and the most urgent item on the agenda of the National Committee for the second half of the Decade is the preparation of a National Plan of Action for Natural Disaster Reduction.

2. RISK ASSESSMENT OF NATURAL HAZARDS

2.1 Prioritization of Natural Hazards.

Nigerians are or may be exposed to a wide range of natural hazards which produce disasters from time to time. On the bases of:

i. their spatial distribution;

ii. the frequency of occurrence of related disasters; and

iii. the range and magnitude of their impacts,

these natural hazards may be roughly prioritized as follows:

- Tropical storms
- Land erosion
- Floods
- Drought
- Desertification
- Human disease epidemics and health emergencies
- Coastal erosion
- Windstorms
- Livestock diseases
- Plant pests and diseases
- Wildfires
- Harmattan haze
- Landslides
- Earthquakes
- Volcanic eruption

Table 2.1 Some Recent Disasters in Nigeria

Year	Disaster	Number affected	Number Died
1962	Fire: El-Duniya Cinema: Kano	850	470
1967 - 1970	Civil strife	4,500,000	100,000
1969	Yellow fever: Plateau Province	80,000	2,000
1972	Flour Mill explosion: Lagos	100	21
1973	Plane crash (bad weather): Kano	N. a.	176

N.a: Not available.

Table 2.1 Cont'd.

Year	Disaster	Number Affected	Number Died
1973	Drought: Northern States	N. a.	N. a.
1978	Floods: Ibadan	103,000	100
1980	Floods: Ogunpa, Ibadan	30,000	200
1983	Plane crash (bad weather): Enugu	N. a.	100
1984	Boat collision: (Lagos)	N. a.	68
1984	Drought: Northern States	10,000,000	N. a.
1984	Rinderpest: Northern States	2,000,000	N. a.
1985	Medical emergency: Gombe	5,000	200
1985	Cerebro-spinal meningitis: Bauchi and Kano States	2,000	73
1986	Grasshopper and Quelea birds: Northern States	10,000,000	N. a.
1986	Yellow fever: Eastern States	1,200	N. a.
1987	Measles and Cerebrospinal meningities: Bauchi State	1,000	89
1987	Measles: Cross River State	120	100
1987	Yellow fever: Ogun, Ondo, Kwara	1,700	1,000
1987	Toxic Waste Dump: Koko	1,000	N. a.
1987	Cholera: Oyo	N. a.	88
1988	Flash floods: Kano and Borno	300,000	130
1990	Collapse of school building: Rivers State	N. a.	100
1991	Cholera: Kaduna, Niger and Oyo	10,000	7,289
1991	Yellow fever: Bendel State	600	300
1992	Landslides: Imo and Taraba States	N. a.	21
1992	Floods: Adamawa State	10,000	N. a.
1992	Floods: Ede Dam, Oshun State	3,000	13

N. a.: Not available.

2.2. Hazard Assessment

2.2.1 Tropical Storms

Tropical storms are weather systems characterized by heavy, torrential rainfall. Normally of short duration, they may last for several hours. Most of the rainfall received in Nigeria is produced by these storms. Because of the torrential nature of the rainfall and the gusty winds, they promote natural hazards in the form of:

- poor visibility, which may lead to plane crashes, as at Enugu in 1983;
- urban flooding, as in Lagos, Sokoto, Maiduguri and Ibadan;
- river flooding;
- dam bursts, e.g. Bagauda Dam in 1988;
- land erosion and landslides;
- destruction of crops by hail and gusty winds.

At the beginning and also at the end of each rainy season line squalls move across the country from north east to south west, their tracks marked by these tropical storms with associated strong winds which may destroy whole settlements.

2.2.2 Land Erosion

Next to tropical storms, land erosion is the most widespread natural hazard in Nigeria. Either as sheet or gully erosion or as a combination of the two, land erosion is a problem in many parts of the country. In the area north of the Niger and the Benue, sheet erosion is a serious problem in the Sudan Savanna Zone, covering Sokoto, Kebbi, Katsina, Kano, Jigawa, Yobe and Borno States. Gully erosion of a generally shallow nature is widespread in the upland areas of Sokoto, Katsina, Kano, Kaduna, Bauchi, Jigawa and Plateau.

In south-western Nigeria, gully erosion is to be found in the Oyi Basin of Kogi State and the Owan, Orle and Ojo Basins of Edo State. But in the area as a whole, it is predominantly an urban phenomenon, plaguing such towns as Auchi and Benin (Edo State) and Effon Alaye (Ondo State).

STORM DAMAGES 200 SCHOOLS

The spate of rainstorms heralding the planting season has wreaked havoc in 10 out of the 21 council areas in Imo State, leaving in its trail extensive destruction in 200 schools.

The gale (winds) which had earlier claimed the life of an innocent 12-year old student in the state and damaged over 10,000 classrooms in Osun State visited Imo State during the Easter period.

Consequent on the schools' destruction, Imo State's pupils in the affected schools, on resumption after the Easter holidays, are now receiving lectures under trees and in partly-damaged classrooms without roofs.

Conservatively, school heads and local government officials estimated that communities, state and local governments would require over N100 million to effect repairs in the affected schools.

The headmaster of the Practising School 1, Orlu, Mr. Emmanuel Okafor, whose school was seriously damaged, lamented that the disaster had adversely affected his pupils who were compelled to take their lessons under trees.

He appealed to the State and Orlu Local Government Disaster Relief Committees as well as the Parents/Teachers Association to come to the aid of the School.

At the Central School, Nrlukwu Amuzu in Abok-Mbaise Local Government, it was observed that four classroom blocks built through communal efforts were badly damaged by the windstorm.

The Headmaster of the School, Mr. A. O. Ime described the tragedy as a great loss to his school as it had made about 120 pupils to study under harsh conditions.

NationalConcord
April 8, 1994.

In Nigeria east of the Lower Niger and south of the Benue, sheet erosion is severe in parts of Adamawa, Taraba, Kogi, Anambra, Enugu and Cross River States, while severe and spectacular gully erosion is to be found in Anambra, Enugu, Imo, Abia and Akwa Ibom States.

2.2.3 Floods

Flooding occurs throughout Nigeria in any one or more of three main forms:

- coastal flooding;
- river flooding, including flash flooding; and
- urban flooding.

Coastal flooding occurs in the low-lying belt of mangrove and fresh water swamps along the coast. It is characteristic of the months of July, August and September but some places may be under water for up to five months in the year.

River flooding occurs in the flood plains of the larger rivers throughout the country, particularly those which have not yet been dammed. Flash floods are the sudden, short-lived floods associated with rivers in the savana areas of the country. Such rivers are normally dry or flow only as a trickle. Cloud bursts can turn them into destructive raging torrents within half an hour. Floods of this type are particularly dangerous because they are difficult to predict and can wash out bridges, culverts, and whole sections of roads and railway lines, thus posing a serious threat to land transportation. They also destroy farmlands in riverine areas.

By virtue of the area affected, the floods of the Niger Delta are in a class of their own. Affecting some 24,000 sq.km., either permanently or seasonally, they constitute a key environmental problem hindering the economic development of the Niger Delta area.

Urban flooding occurs in towns located on flat or low-lying terrain, especially where little or no provision has been made for surface drainage. Extensive flooding is characteristic of every rainy season in Lagos, Sokoto, Maiduguri, and Aba, to mention a few towns. In Ibadan, the Ogunpa River overflows its banks from time to time. In 1980, it rose and covered about 6 sq.km. Some 200 people were drowned and 30,000 rendered homeless.

Any consideration of flood hazards in Nigeria must take into account the potential risk of dam breaks. Thus in August, 1988, the Bagauda dam, a relatively small earth dam in Kano State, broke under the impact of the run-off waters generated by torrential rainfall. The raging waters which swept down the valley from the reservoir destroyed whole villages and much farmland. Some 146 people died while property damaged was estimated at N650 million.

SOME RECENT FLOOD DISASTERS IN NIGERIA

Some recent documented flood disasters in Nigeria afford a good insight into the extent of flooding and flood-related problems in our country. Flood disasters have been recorded at Ilorin in 1973, 1976, and 1979. In the flood event of 1976 alone, 24 houses were submerged and 56 others had to be evacuated. The flood waters also washed away vegetable and sugarcane farmlands, while many roads in the city were rendered impassable.

"Floods hold up class." This was the screaming headline of the lead story in the *Evening Times* of June 14, 1985. The story described how most of the classrooms of primary and post-primary institutions in Lagos were turned into pools of water after a downpour, holding up classes for one week. It sums up the annual situation with respect to the menace of floods in Lagos, a low-lying coastal city. No matter where one lives in Lagos, it is the same story of flooded streets and homes almost each time it rains heavily, especially from June to September. From Victorial Island to Ikoyi, from Maroko to Agege, from Isolo to Oworonsoki, Lagos floods are no respecter of persons, and the story has been the same over the years. In June 1988, when it rained for three days straight in Lagos, the 'river' near the Lagos University Teaching Hospital (LUTH) in Surulere over-flowed its banks and rendered Ishaga Road at that point impassable. The same was true of Awolowo Road, Ikeja, Ijora Causeway, Bodija, Agbo Malu, Apapa, and the Apapa-Oshodi Expressway at the intersection leading to the Murtala Mohammed International Airport.

Residents of Chief Natufe Street in Surulere, Lagos, woke up on Saturday, July 9, 1988 to find themselves virtually in water. The previous night's rain which started from dusk and continued right through the following morning had caused untold havoc, throwing everybody into a state of panic. Some people were trapped in their homes because of the flood water which was waist high. They had to be rescued by people who provided them with all kinds of materials like old bath tubs and refrigerator frames as canoes, for a price. Some sewage tanks over-flowed and mixed with water in underground water tanks, thereby polluting peoples' drinking water for many days. The cause of this flood was,unfortunately, largely man-made. A canal which runs from

LUTH right through certain parts of Surulere into Orile-Iganmu, which was supposed to be a channel for the evacuation of water, had been blocked by solid waste and sediments and should have been dredged before the peak of the rainy season.

Flood disasters are not limited to the extreme southern part of the country. Kano State in the semi-arid Sudan savanna environment, was affected by floods in August, 1988. A rainstorm, described as one of the heaviest in an 80-year instrumental record, persisted over Kano for a few days, generating floods in various parts of the State. The rainstorm and the flood waters which it produced caused the Bagauda Dam near Kano, with a storage capacity of 22 million litres of water, to reach an unprecedented volume of 142 million litres before it collapsed on August 17, 1988. The havoc wreaked by the collapse of the dam and the rainfall floods resulted in the loss of 146 lives, destruction of 18,000, houses, washing away of 14,000 farms, displacement of 200,000 people, and damage to residences and infrastructure worth about 650 million naira.

Not many parts of northern Nigeria were spared by the raging floods of 1988. On August 18, for example, many roads in Kaduna were flooded, leaving motorists stranded. The road to the Kaduna International Airport was taken over by floods. In the Misau Council area of Bauchi State, four persons were killed and over 750 houses and property, including crops, worth hundreds of thousands of naira were destroyed by floods, following a heavy down-pour. Heavy rains in various parts of Borno State resulted in the loss of 52 lives, and the destruction of over 170 houses and much property. In Niger State, crops estimated at more than N100,000 were washed away by floods in Gawu district of Suleja Local Government Area lone. The River Niger flooded Bagudu, Bunza, and Argungu Local government Areas of Sokoto State and, as a result, about three hundred villages and settlements were submerged. Hundreds of farms were also flooded and crops (e.g. rice, maize, millet and sorghum) destroyed. In addition to the sacking of hundreds of families, the total value of things destroyed in the flood was roughly estimated at 100 million naira.

In September 1989, heavy and continuous rainfall resulted in the flooding of about 130,000 hectares of agricultural land in some parts of Cross River and Akwa Ibom States as a result of the Cross River overflowing its banks. This flood was

estimated to have left about 150,000 farming families homeless and destroyed food crops (e.g. rice, yam, cassava, cocoyam, and maize) and economic trees worth millions of naira. In Uyo alone, about 500 families were displaced and property worth millions of naira was destroyed.

Not only is flooding becoming more frequent, especially in our cities, it has also become more severe and devastating over the past few decades. The increasing frequency and severity do not stem from increased rainfall. On the contrary, rainfall amounts have, overall, been on the decrease. Rather, they are in response to an increasing rate of urbanisation in the absence of well-articulated and comprehensive physical planning and planning control. For example, Ibadan, a non-coastal city, has been afflicted by more frequent and more damaging floods than many of our coastal cities as a result of bad planning.

NEST, *Nigeria's Threatened Environment: A National Profile.*

There are several hundred dams in Nigeria, ranging in size from very small earth structures to gigantic earth-and-concrete structures. They need to be closely monitored in order to protect people and infrastructures against the possibility of failure.

2.2.4 Drought

Drought is a climatic event involving a shortage of rainfall so serious as to adversely affect water supplies and crop and livestock production, causing much disruption of economic activities and producing some (usually temporary) ecological changes.

Drought affects the whole of Nigeria, but its frequency of occurrence and severity increase with increasing latitude. In the Sudano - Sahelian belt drought occurs frequently. But incidences are irregular and unpredictable and the damage caused is often sudden and dramatic. Its impacts include:

i. reduction of standing biomass and of primary productivity;
ii. reduction of wild populations, including soil fauna;
iii. decimation of livestock populations;
iv. crop failures, leading to famine and environmental refugees; and
v. forced movements of people which may bring menacing pressures to their parts of the country, and sometimes, political strife.

2.2.5 Desertification

Desertification presents a formidable problem to sustainable development, especially in the dryland environments of Nigeria. It is a process of ecological degradation of dryland resource systems that is slow and imperceptible. It is caused by a combination of the inherent ecological fragility of the land and water resources that form the life-support systems of the dryland societies.

That areas north of latitude 12^0N in Nigeria are prone to the desertification process is well known. Recently, the Federal government of Nigeria, acting on the basis of reports available to it, declared that the area affected extends to latitude 9^0N. The region constitutes about 30% of the total land area of the country. It is located within the Sudano-Sahelian Savana ecosystem and covers all or parts of Borno, Yobe, Bauchi, Taraba, Adamawa, Jigawa, Katsina, Kano, Kaduna, Plateau, Sokoto, Kebbi and Niger States. these States contain about 48% of Nigeria's population. Currently the desertification process is steadily spreading southwards.

Desertification, like other ecological changes, has several impacts.

These include:

i. reduction of phytomass, primary productivity and biodiversity;
ii. reduction of the population of wildlife, including soil fauna;
iii. degradation of livestock;
iv. soil erosion, loss of organic matter, salinization and crusting;
v. reduction in agricultural productivity resulting in persistent food deficits; and
vi. forced movements of the people, bringing pressures to bear on host communities as well as causing political strife.

2.2.6 Human Disease Epidemics and Health Emergencies

Almost all disasters, whether natural or man-made, exert grave short-term and long-term adverse effects on the health of the people. Physical injuries may be the direct consequences of some natural or man-made disasters such as earthquakes, collapse of structures, and fire. The injuries include fractures, lacerations, burns, major organ rupture and bleeding. Other disasters such as drought, desertification and civil strife are characterised by population movements which cause an increased risk of diseases transmission and decreased standard of

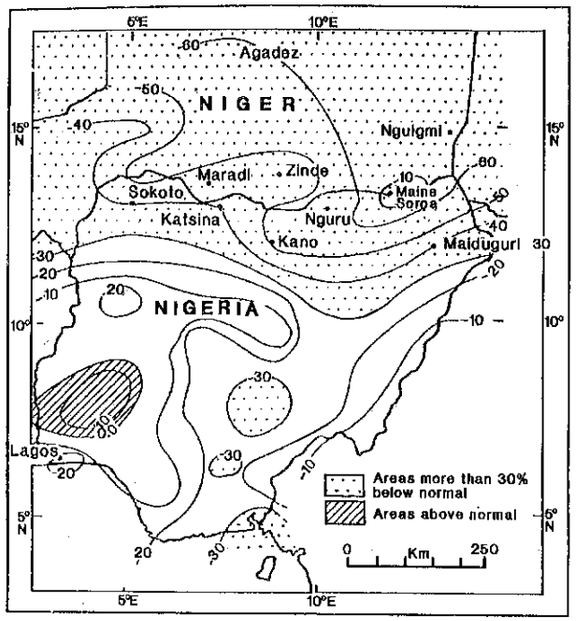

Figure 2.1

Rainfall departures from the mean in 1973 (per cent). After J. S. Oguntoyinbo and P. Richards (1978) 'Drought and the Nigerian farmer', *Journal of Arid Environments,* 1:165 - 94; and H. Derrienic *et al* (1976) *Famines et dominations en Afrique. Paysans et eleveurs du Sahel sous le joug.* Rennes: Universite de haut Bretagne. The drought of the early 1970s was particularly severe and protracted and affected virtually all parts of Nigeria.

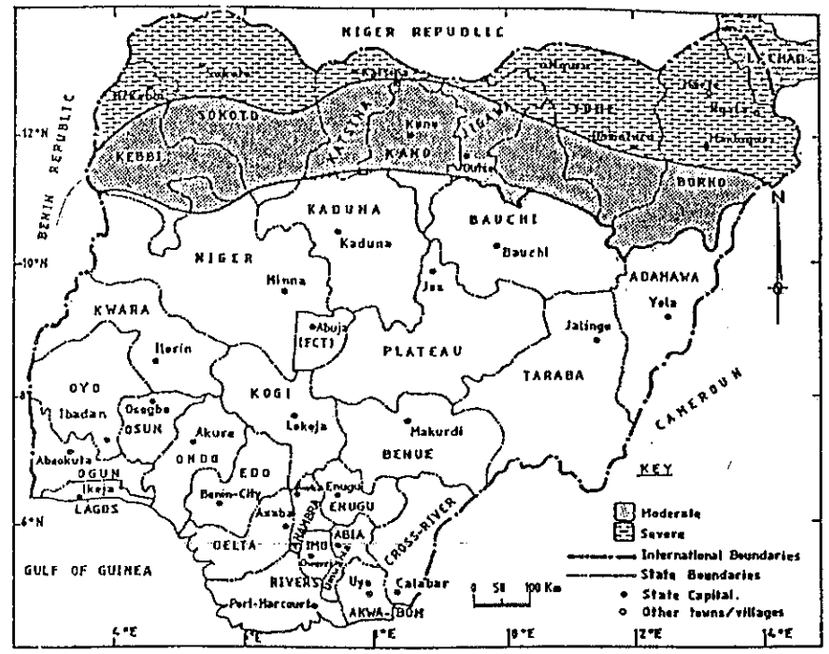

Figure 2.2

Status of desertification in Nigeria.
After E. O. Odadipo, 'A comprehensive approach to drought and desertification in Northern Nigeria', *Natural Hazards,* 1993, 235 - 261.

sanitation and of resistance to disease. These contribute to the spread of communicable diseases. Food shortages as a result of drought and desertification also induce famine and resultant nutritional problems.

In Nigeria, a number of diseases cause disasters. They include cholera, cerebrospinal meningitis, yellow fever, guinea worm and the scourge of the moment - the Acquired Immune Deficiency Syndrome (AIDS). These diseases affect such numbers of people that effective eradication or control during outbreaks now totally depends on the level of external assistance due to inadequacy of basic health services.

Aids

The earliest announcement of the disease in Nigeria was in 1984 when it was reported in a sexually-active 13 year-old girl. Subsequently, it has been reported in people of both sexes and of all age groups, including neonates, putting the whole of the country's population at grave risk. Currently over 500,000 Nigerians are presumed to be HIV - positive and about 1000 are thought to have developed the disease, out of which 537 have died.

Aids is now a major issue of immense public health importance in Nigeria. Its rate of increase is alarming, doubling each year, and now involving all categories of Nigerians, including health workers. It has resulted in a growing increase of orphaned children and the incapacitation of many working adults.

Yellow Fever.

Yellow fever is a multi-systemic viral disease of high morbidity and mortality. It is transmitted by some type of mosquitoes from an infected man to man or an infected monkey (reservoir) to man.

The last known epidemic of yellow fever was early this year, 1994, and involved the Eastern States of Abia and Imo. There have been previous outbreaks in Delta (1991) and other parts of Nigeria (1986-1988).

Yellow fever affects all age groups. During epidemics it is not unusual for 20% of the entire population in an area to become infected, for 2-4% to become severely ill and for 1 - 2 % to die from the disease. There is no specific anti-viral drug for the treatment of yellow fever and management of the infected patient involves management of the associated complications.

Cerebrospinal Meningitis

Epidemic meningitis continues to be an important health problem in Nigeria, particularly in the Northern States. This is because Nigeria is within the CSM belt of Africa which lies between the Equator and the Sahara, extending from the Upper Volta in the west to Ethiopia in the east.

KILLING THE KILLER DISEASE

Despite its Predictable Occurrence, Meningitis Takes Governments by Surprise.

The doctor reached for the neck of the young boy sobbing in pains and tried to bend it, it remain stubbornly stiff. He lifted the boy's leg and, with some effort, raised it above the bed. The doctor finally declared: "We are making progress. A few days ago, we could not move that leg."

Isiaku Umaru, 15, who by April 14, had spent his sixth day at the hospital suffers from cerebro-spinal meningitis, CSM. He is part of the high-risk age group and the 2,186 cases so far reported in Kaduna State.

Kaduna State is however not alone. The northern part of Nigeria comprising 10 states falls within what has been tagged the meningitis belt of Africa, a zone stretching across the middle of the continent, 600 kilometres north of the equator, including countries like sudan, Niger, Burkina Faso, Senegal, Chad, Togo, Ethiopia. These countries share remarkably uniform climatic conditions characterised by a long dry season with very low relative humidity between January and April.

In Nigeria meningitis is a well known seasonal scourge, having appeared sporadically every year in the last 100 years, between December and Arll and in epidemic proportions almost every decade. the last epidemic was in 1977 and it is only a year short of a decade in its return visit this year; leaving in its trail blindness, deafness, paralysis and death.

The causative agent in epidemic meningitis, according to a Professor and Head of Department of Medicine, Ahmadu Bello University, Zaria, is an organism capable of fermenting glucose and maltose (known as neisseria meningitidis or meningococcus) and have different stereotype (groups) A, B, C. The Group B variety does not cause epidemics in the country. He said that the most important aspect in the transmission of the disease is absolute humidity of the environment, poor living conditions and overcrowding. The mode of transmission via respiratory passages is from person to person by direct contact. The doctor explains that many people are carriers of the virus without necessarily having the disease. Symptoms of CSM include fever, severe headache, nausea, vomiting, muscular and back pains, generalised weakness, seizures, visual defects, shock from a drop in the blood pressure, facial paralysis and stiff neck. Diagnosis, according to experts, depends on finding the meningococcus in the cerebrospinal fluid, obtained from a lumbar puncture.

Epidemiological figures show that Kano State is hardest hit with over 3,100 cases reported, with Kaduna State a close second. The director of Medical Services in Kaduna State Ministry of Health and Social Welfare says that Katsina Local Government Area in the state is where the epidemic has been concentrated. Seven hundred and twelve cases, of which 62 have died, have been reported. According to him, the furthermost parts of the state - Daura, Funtua. Katsina - have the largest number of cases. Sokoto figures last month were put at 55 cases with nine deaths, but health officials say the number should be 10 times as high now. In Gongola State, CSM has claimed over 100 lives in Numan, Bali and Wukari Local Government Areas where measles, a heat-induced disease, has reportedly claimed the lives of over 69 children.

Previously, the drug sulphonamide was used in the treatment of CSM, but it was discovered that the meningococcus did not respond to it. The treatment, has been replaced with high doses of antibiotics like crystalline penicillin, chloramphenicol and ampicillin. These require frequent injections but sometimes, single long-acting injections of penicillin and chloramphenicol (Tephomycine) is used. At ABUTH, Zaria, a first time trial of sulbactam/ampicillin was used to treat the epidemic with excellent results.

Vaccination remains the only effective form of prevention known. However, the appearance of the disease in epidemic proportions in Borno, Gongola, Plateau and Bauchi states has puzzled a team of researchers at ABUTH, who are part of a team which conducted massive vaccination campaigns in these four states from 1978 to 1981.

Following the vaccination of 7,535,350 persons, there was a decline in the overall number of cases reported as well as in the number of deaths in the area, where since 1978, there has not been an epidemic of meningococcal meningitis. The results suggested that vaccination is an effective means of preventing outbreaks of the disease and of possibly eradicating it.

In Bauchi State, investigations revealed that while adequate antibodies persisted in adults four years after vaccination, they were insufficient to confer protection in younger children. Experts have recommended a rational policy for revaccinating younger children after two years, older children after four years and adults after 6 - 8 years.

But even if vaccination may be only a stop-gap measure, it does not appear that many states are equipped with vaccines. CSM has occurred, predictably several times in the past such that the affected states should not have been taken unawares. Health officials have had to run around looking for funds,

drugs and vaccines. Borno State Commissioner for Health said her state could not effectively check the disease without Federal assistance, and that available stock of vaccines in the state could not meet demands.

Other states like Kano have had to borrow vaccines from Kaduna State, which was prepared for the sourge. The Permanent Secretary, Kaduna State Ministry of Health told *Newswatch* that, in anticipation of the outbreak, the state embarked upon mass immunisation and monitoring of health units. By the middle of March, one million people had been immunised in the state. Kaduna State received an additional half a million doses from the Federal Government.

In the southern parts of Kaduna State, Bauchi, Gongola and Plateau States, the worst is over. Mass immunication and the start of the rains in these areas, according to the Chief Medical Officer at the Kaduna State Health Management Board, have reduced the incidence of the disease. In Kaduna Local Government Area eight cases have been reported, compared to 145 cases in the peak period. The teaching hospitals, over-burdened in the last month with CSM patients, now have only a handful.

The attitude to meningitis appears to be reactionary. The Borno State Commissioner for Health was quoted as saying that people do not respond, until there is an outbreak and victims are dying.

Beyond mass immunisation, it is believed that a housing policy, which provides adequate houses for those inhabiting windowless huts and information on proper ventilation techniques, are required.

Newswatch, MAY 5, 1986

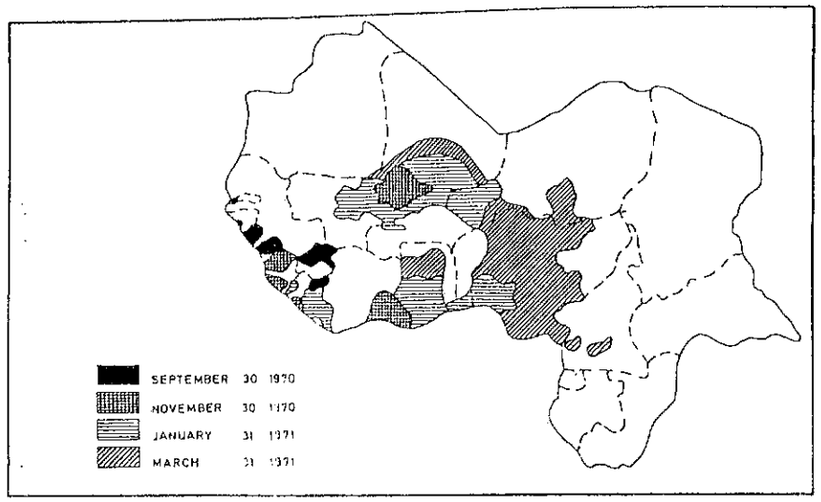

Figure 2.3

Countries in West Africa which reported cholera between September 30, 1971, the epidemic had spread to North Eastern Nigeria. (After R. Schram, "The 1971 cholera epidemic in Zaria, Nigeria," *Savanna,* 1, 1972, 213-222.

The weather conditions in this area favour its spread which is mainly airborne. Epidemics in Nigeria occur cyclically almost every 10 years. It usually occurs in the middle of the dry season when temperatures are high (sometimes above 40^0C) and the absolute humidity is low (sometimes below 2g per m^3).

During epidemics, the entire area of northern Nigeria is at risk. Young people are mostly affected, 45 - 50% occurring in those aged between 5 and 15 years.

Cholera

Cholera persists around the world as a disease of poverty. It struck in Nigeria in the early 1970s. The last known major epidemic was in 1991. Whenever it strikes it claims hundreds of lives across the country. Factors that have been found to encourage the epidemic in Nigeria include:

i. indiscriminate defecation;

ii. inadequate personal hygiene;

iii. overcrowding;

iv. the sharing of toilet facilities by too many people without appropriate sanitation;

v. the bursting of sewerage systems and contamination of water supplies;

vi. scarcity of water for sanitation; and

vii. poor waste disposal system.

Cholera is characterised by profuse watery diarrhoea which quickly leads to cardio-vascular collapse and death.

Other (Silent) Epidemics

There are several other epidemic diseases of a more silent nature in the Nigerian environment which are associated with great morbidity and mortality. They constitute a great health problem because of the chronic depletion of both skilled and unskilled manpower and also the drain on our scarce financial resources which they cause. Indirectly, they adversely affect the execution of all national health and related programmes.

Among these endemic disease conditions are guineaworm infection (dracunculiasis), tuberculosis, typhoid, leprosy, onchocerciasis, schistosomiasis, road traffic accidents, neo-natal tetanus, malaria, serum hepatitis and leishmaniasis. However, these diseases or conditions are at varying levels of eradication or control with the support of various international donor agencies.

2.2.7 Coastal Erosion

Erosion by wave action is widespread along Nigeria's 800 km. - long coastline. Recent measurements put the rate of shoreline retreat as a result of erosion at between 2 to 6m per year along Badagry Beach in Lagos State and 25 to 30m per year on Victoria Beach in Lagos. The rates on other sections of the coastline are 20 to 30m per year (Awoye/Molume in Ondo State); 18 to 24m per year (Ogborodo/Escravos in Delta State); 20 to 22m per year (Forcados in Delta State); 16 to 19m per year (Brass in Rivers State) and 10 to 19m per year (Ibeno-Eket in Akwa Ibom State). This coastal erosion poses a serious disaster threat wherever there are settlements or structures located on or a short disaster from the coast.

As far as coastal erosion in Nigeria is concerned, the year may be divided into two periods:

i. a period of relative inactivity when waves are predominantly of the spilling type. In general, this lasts from November to May; and

ii. a period of active erosion when waves are predominantly of the plunging type. This extends normally from June to October, with most of the erosion taking place in August, September and October.

From time to time, particularly destructive waves hit the Nigerian coastline, posing a serious threat to prime properties in places such as Victoria Island in Lagos. The recurrence interval of these storm waves is not known.

2.2..8 Windstorms

Windstorms are intense atmospheric disturbances characterised by dangerous gusts of wind but no rain. They occur typically at the beginning and at the end of the rainy season and are often associated with squall lines. Damaging gusts of over 43 knots may be expected twice a year along the coast and three times a year in the interior. Windstorms often herald the coming of a line squall which, when it finally arrives at a particular location, may produce heavy rainfall. Alternatively a line squall may degenerate into wind storms as it moves in a south-westerly direction across the country.

Wind gusts may also occur in association with dust devils, especially in the drier northern part of the country. A dust devil is a whirling column of air some 6m in diameter around a vertical or near-vertical axis. Its strong winds may whip up the dust, tear down huts and remove the roofs of houses. Up to 20 or 30 dust devils may occur in a locality per day.

Wind storms occur throughout the country.

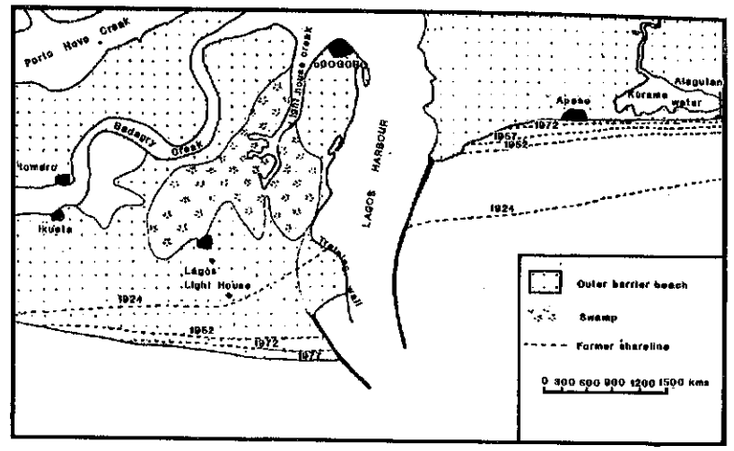

Figure 2.4

Sand accretion on Light House Beach to the left of Lagos Habour and catastrophic erosion of Victoria Beach to the right of the Harbour, 1924 - 1977. (After E. Usoroh): Erosion of Victoria Beach is a threat to prime urban properties on Victoria Island.

2.2.9 Livestock Diseases

Livestock diseases are among the most important constraints to livestock development in Nigeria. Major outbreaks often result in huge losses in terms of herd populations and vitality. Major livestock diseases of economic importance in Nigeria that have assumed disaster levels include:

i. Contagious Bovine Pleuro - Pneumonia (C. B. P.P.)

ii. Rinderpest;

iii. Pests des-petits-ruminants (P.P.R) in sheep and goats; and

iv. Newcastle disease.

C. B. P. P. and rinderpest are prevalent in northern Nigeria where cattle production is a major trade. The areas particularly affected include Jigawa, Kano, Bauchi and Kebbi States. They have also been reported in Sokoto, Kaduna, Kwara, Niger and Plateau States.

Pest des petit ruminants is endemic in Nigeria, especially in the humid areas. It is a disease of goats and sheep with a record of 60% mortality.

Newcastle disease is a common occurrence in poultry and has become endemic in Nigeria. It is the major disease of poultry. Pockets of serious outbreaks record mortality as high as 100%.

2.2.10 Plant Pests and Diseases

Until recently, incidents of plant pests and diseases were not systematically recorded and monitored, but attempts were only made to combat or prevent them. However, today, with improved plant and animal husbandry, plant pest and disease outbreaks are identified and documented and remedies to them sought.

Plant pests and diseases are prevalent all over Nigeria, from the humid rain forest to the dry Sahel. They often impose severe limits on the general output of plants, including food crops. They reduce the photosynthetic capacity of plants, thereby reducing their performance in terms of growth, branching, flowering, fruiting and seeding. They also reduce the rooting, ruber formation and nutting capacity of plants. This in turn reduces the forage and food production capacity to sustain human and animal populations effectively. consequently, this introduces another phenomena into the economy of the country, whereby, food importation at a very high cost in foreign exchange has to be done to sustain a healthy human population and an effective labour force to sustain the economy.

The major factor influencing the incidence of plant pests and diseases in Nigeria are the climate, terrain, patterns of population distribution and human influence. The two most important climatic elements are moisture and temperature. This is because pests and disease agents, in general, do better under conditions of optimum water supply and high temperatures such as obtain in Nigeria. For instance, grasshopper epidemics can only occur when dormant eggs laid in past years receive sufficient moisture and warmth for hatching of new hoppers.

The loss of farm produce due to pests and diseases in Nigeria can be of a crippling magnitude, such that in the past, whole communities have lost an entire season's crops to pests and diseases, forcing Government to embark on emergency relief supplies to alleviate the sufferings of the starving masses. This has had a corresponding negative impact on the national annual food supply, foreign exchange earnings and expenditure.

Plant Diseases in Nigeria

Plant diseases which pose a disaster threat in Nigeria can be grouped into three types: viral diseases, fungal diseases and bacterial diseases.

Viral Diseases and Susceptible Plant Species

1. Swollen shoot: cocoa.
2. Lanceolate mottled leaf: yam.
3. Mosaic: yam.
4. Leaf spot: yam and cassava
5. Brown and red leaf spot: yam, cassava, rice, sugar cane, guinea corn, millet.
6. Leaf mosaic: tobacco, kola, groundnuts, cassava, yam.

Fungal Diseases and Susceptible Plant Species

1. Black pod: cocoa, coconut, citrus, cotton.
2. Mealy pod: cocoa, coffee.
3. Brown pod: cocoa.
4. Collar nut: oil palm.
5. Stem nut: oil palm,
6. Anthracnose: oil palm, cotton.
7. Fruit cluster: oil palm.
8. Vascular wilt: oil palm
9. Coffee rust: coffee
10. Grey mildew: cotton
11. Black root nut: tobacco, groundnuts, cowpeas.
12. Wilt: groundnuts.
13. Witch broom: yam.
14. Rust: maize.
15. Blast: rice.

Bacterial Diseases and Susceptible Plant Species

1. Angular leaf spot: cotton
2. Bacterial blight: cotton, guinea corn.

Plant Pests in Nigeria

Some of the transmitters of plant diseases are actually pests or insect vectors which take up and pass on the virus during feeding. In addition to the vectors, there are worms, insects and larger animals which cause physical damage to crop plants, leading either to death or reduced yields.

Plant Pests and Susceptible Plant Species

1. Stem borers: maize, millet, sugar cane, rice, kola, coffee, oil palm, cotton, yam.
2. Worms: maize, yam, tobacco, okro, pepper, tomatoes.
3. Grasshoppers: cassava, cocoa, kola.
4. Termites: yam (tubers).
5. Locust (Migratory Locust, Red Locust, Desert Locust): all green plants.
6. Variegated grasshopper: cassava, citrus.
7. *Quelea quelea* : rice, millet, guinea corn, maize.
8. Grass cutter: Maize, sugar cane, melon, cassava, yam.
9. Rodents and rats: maize, cocoa, melon.
10. Lizards : seeds (planted).
11. Bush pig : yams, cassava.
12. Guinea fowls : cereals and groundnuts (planted).
13. Francolius/spur - fowls : all grains.
14. Abyssinian ground hornbill: groundnut (planted).

2.2.11 Wildfires

Wildfires occur almost everywhere in Nigeria where combustible material is available, particularly in the dry season. It is generally recognised that this ecological factor has fundamentally altered the original vegetation cover. Fire has played significant roles in the

evoluion of human beings from time immemorial. Among these roles, the destructive aspect has received international attention.

Nigeria suffers enormous economic losses through uncontrolled wildfires, 80% of which are believed to be deliberately set. These losses are irreplaceable and absolutely unaccountable, considering the potential economic and psychological damage which they inflict on the people and the environment. Although systematic records of wildfire occurrences is not being kept, a comprehensive study in seven southern states indicates that of the 12, 274 hectares of plantation established, 11, 222 ha was affected by fire while 1,785.3 ha or 14. 55% was completely destroyed in 1992/93 alone. This loss amounted to N1.78m.

Not more than 30% of natural forests survive the devastating effects of fires while wildlife and rare plant species are threatened with extinction. Economic trees such as *Theobroma cacao* (cocoa) *Cola nitida* (cola) *Musa paradisiaca* (banana) coffee, etc. in Edo, Ogun, Oyo, Ondo and Oshun States suffer severe damages. The suitability of timber species, productivity of fruit-bearing wild species, incremental growth and regeneration potentials become adversely affected.

Biodiversity has dwindled over the years, culminating in gradual desertification that usher in hash environmental conditions which make life uncomfortable. These conditions which are most prominent and prevalent in the savana region derive from incessant use of fire in combination with traditional farming methods.

2.2.13 Harmattan Haze

Harmattan haze consists of fine solid aerosols in the air. It occurs, especially during the morning hours in the dry season period of November or December to February or March. The main source of the dust is the arid area to the North East of the country from where it is carried high into the air and blown across the country. In addition, substantial amounts of dust are injected into the atmosphere within the country by bush fires and dust devils.

Harmattan haze affects the entire country, but its intensity and period of occurrence decrease from north to south.

2. 2.14 Landslides.

A landslide is a rapid sliding of a large mass of rock which may or may not disintegrate into debris of various sizes in the process. Landslides

occur in areas of very steep slopes. They are not very common in Nigeria, occuring mainly in four situations:

i. on the sides and heads of deep gullies, such as those in Agulu-Nanka in Enugu State;

ii. on actively-eroding river banks; such as in the Niger Delta;

iii. on steep slopes on the Mambilla Plateau in Taraba State; and

iv. on steep slopes which have been undermined by cutting to make way for roads.

2.2.15 Earthquakes

In recent times Nigeria has recorded a number of tremors in various parts of the country. Back in 1933 a tremor was reported in Lagos followed by one in Warri in 1939. In 1960 another tremor was recorded in Ohafia in Abia State. Garu in Kano State reported a tremor in 1975. The 1981 incident in Kombani in Bauchi State drew some attention. The best known episodes are those of Ijebu Ode in July, 1984, measuring about 4.0 on the Richter scale. Another quake occurred in parts of Oyo and Ogun States in August of the same year. In November, 1987 a tremor measuring 4.8 on the Richter scale was recorded in Gembu on the Mambilla Plateau in Taraba State. The last recorded tremor was in Ogun State and measured about 3 on the Richter scale. These incidences, coupled with the occurrence of earthquakes in neighbouring nations of Ghana, Guinea, Cameroun, Gabon, and Zaire, indicate that Nigeria is vulnerable to earthquakes. This is further evidenced by the existence of major fracture zones within 5^0S and 5^oN of the Equatorial Fracture Zone. The Zones which comprise the Romanche Chain and Charcot Fracture Zones have been associated with the seismicity of the West African Continental land mass.

2.2.16 Volcanoes

Most of the earthquakes reported in neighbouring Cameroun Republic are associated with volcanic eruptions. In Nigeria there are dozens of volcanoes in and around the Benue valley. These areas are adjacent to the belt of active Vulcanicity in Cameroom Republic. This fact, together with the occurrence of the Lake Nyos Disaster, have raised popular interest in the possibility of these volcanoes becoming active again or of new ones forming in the same general area. The National Technical Committee on Earthquake Phenomena is monitoring some of the crater lakes in the area for this reason.

2.3 Vulnerability Assessment

2.3.1 Tropical Storms

The entire population of the country is at risk in one form or another from tropical storms. Particularly vulnerable are:

i. people who live in flat and /or low-lying urban centres; which are easily flooded;

ii. people who live on the flood plains of the larger rivers;

iii. rural residents whose houses are made of materials that cannot withstand strong winds.

Tropical storms, either directly or indirectly, result in the destruction of farmlands as well as physical infrastructures, such as buildings, roads, bridges, overhead power and telephone lines etc. Thus tropical storms wreaked havoc in three Local Government areas of Ondo State in March, 1994 and in ten Local Government Areas in Imo in early April, 1994.

Only rarely have attempts been made to assess the economic damage due to tropical storms, such attempts being limited to disasters which affect only a small area or a particular object. A good example is an air crash. For other disasters of a more widespread or "dispersed" nature there is usually:

- a fairly accurate record of the number of lives lost, if any;
- a not - so - accurate record of the number of people injured;
- an also not - so - accurate record of the number of people rendered homeless; and
- a very rough estimate of the type, number and economic value of physical infrastructures damaged or destroyed.

In 1992/93 rainstorm damage was reported to the National Emergency Relief Agency from some 88 Local Government Areas in 12 States (Abia, Edo, Delta, Ogun, Ondo, Imo, Cross River, Oyo, Kwara, Rivers, Akwa Ibom, Plateau). The total estimated damage was N1855 billion. There is nothing to suggest that the 1992 rainy season was an unusual one. But the estimated value of damage suffered may have been inflated.

2.3.2 Land Erosion

According to the 1990 World Bank Report, about 50 million Nigerians are at risk from soil degradation, which includes erosion, most of them

consisting of poor rural dwellers. The negative impact of soil erosion is in terms of:

- loss of agricultural land;
- loss of productivity of agricultural land;
- damage to physical infrastructures, such as buildings, roads, bridges, etc;
- loss of reservoir storage capacity due to siltation;
- loss of quality of water in rivers, lakes and reservoirs; and
- loss of water quality in aquatic ecosystems.

The economic impact of land erosion is notoriously difficult to evaluate. According to the World Bank Report, the long-term impact of soil erosion in terms of the cost of food replacement required through net imports could exceed US $3 billion while unchecked gully erosion could add another US $100 million per year.

2.3.3 Floods

At least 20% of the population of Nigeria is at risk from one form of flooding or another. This includes the whole spectrum from the rich urban residents of Victoria Island, Lagos to poor farmers or fishermen in the Benue Valley. Flooding is a threat to all physical infrastructures, including residential accommodation, commercial and industrial properties, roads, rail lines, bridges, port installations and so on. It also destroys farmlands, including standing crops. Losses due to flooding run into many billions of Naira per year.

2.3.4 Drought

The gravity as well as reoccurrence of drought adversely affect sustainable development and the livelihoods of millions of people in different parts of Nigeria, either directly or indirectly. In addition, where drought occurs, food security and energy balances became increasingly menaced along with life-support systems. The health and welfare of the population are also adversely affected.

During the drought of 1972-1973, about 300,000 animals, representing some 13% of the livestock population of north- eastern Nigeria, were estimated to have died. Agricultural yields dropped to between 12% and 40% of the annual averages. In the drought year of 1987 crop yields ranged between 56% and 75% of the 1986 totals.

The consequences of environmental breakdown as a result of a prolonged drought reverberate through a community in decreased birth rates among displaced populations, in higher infant mortality rates and in all manner of personal distress.

2.3.5 Desertification

Desertification threatens the resilience of the land and hence sustainability. As in other developing countries, desertification has been a major factor in the migration of peasant farmers from affected areas to the slums of major cities, producing economically-disadvantaged urban populations vulnerable to disease, natural disasters, the temptations of crime and civil strife.

2.3.6 Human Disease Epidemics

Aids

The entire population of the country is at risk from AIDS, the risk being greater for the sexually-active than for the sexually-inactive proportion of the population.

Yellow Fever

Yellow fever affects all age groups. During epidemics it is not unusual for 20% of the population of an area to be infected, for 2 - 4% to become severely ill and for 1 - 2% to die from the disease.

Cerebrospinal Meningitis

During epidemics the whole of northern Nigeria is at risk. Young people are mostly affected, 45 - 50% occurring in the age group 5 to 15 years.

Cholera

Cholera affects all age groups and spreads quickly to a large proportion of the population in an area. The entire population in a town may be at risk during an outbreak. Because of the possibility of rapid intercity travel by road these days, the disease can spread over a large area within a very short period of time. This means that during an outbreak, the entire population of the country may be at risk.

2.3.7 Coastal Erosion

Coastal erosion poses a threat to:

- between one and three million people living in hundreds of villages and towns along the coast;
- prime urban land, especially on Victoria Island in Lagos;
- oil production and loading facilities at Escravos, Forcados, Brass, Bonny and Ibeno-Eket; and
- navigational infrastructures.

From time to time storm wave surges which hit the Nigerian coast wreak damage and destruction to structures and livelihoods. For example, in 1986 the sea took possession of Ahmadu Bello Road on Victoria Island, Lagos, which runs parallel to Victoria Beach, as well as adjoining streets. Having overtopped the sand barrier which is Victoria Beach, the sea invaded offices and residential buildings, filling them with flood waters which were knee-deep in places. Meanwhile, the surging waves eroded tremendous quantities of sand from the beach in a question of hours. Nine such surges had occurred between 1977 and 1985.

In the first week of January, 1988, coastal erosion in Ondo State forced thousands of people to flee their homes in more than 25 villages. Several of these settlements were completely swept away by the waves!

2.3.8 Windstorms

The entire population of the country is at risk from windstorms. Particularly vulnerable are:

- huts and other temporary shelters;
- houses with weak walls or roofs;
- overhead utility lines;
- fruit trees, such as coconuts, which may loose their ripe or unripe fruits; and
- road users who may face sudden and drastic loss of visibility due to dust or have dangerous objects thrown across their way.

Windstorms commonly render virtually all the residents in a village homeless. They may also cut off power supply to an area for several days. Thus power supply to the satellite town of Gwagwalada in the Federal Capital Territory was cut off from 21 to 23 March, 1994 by a windstorm which bought down the power line over a distance of several kilometres. Virtually all economic activities which depend on this public facility was paralysed in the town.

2.3.9 Livestock Diseases

Livestock diseases inflict on the country the loss of large numbers of animals from time to time. In 1983/84 alone about 500,000 cattle were lost in 1,081 rinderpest outbreaks. For the decade 1983 to 1993, the total number of cattle lost has been put at 771,304.

Contagious Bovine Pleuro-Pneumonia is still prevalent in Nigeria. In the last decade it is estimated to have claimed 36, 137 cattle.

Thus here is the possibility of resurgence that could undermine the social/cultural values of cattle producers with unwelcome economic and financial implications for the country.

Poultry diseases such as Newcastle disease are still endemic in Nigeria But they can be prophylactically controlled, except when resistance sets in.

Table 2.2 Pest Outbreaks in Borno State, Nigeria in 1993

Pest Species/ types	Time of Outbreak	Areas Affected	IMpact	Estimated Damage
Locusts (all types)	August to Dec.	All over the State	Serious	N20,000,000.00
Grass hoppers	July - December	Northern Borno	Serious	N20,000,000.00
Quelea Quelea	Aug. - January	Northern Borno	V. Serious	N20,000,000.00
Rats/Rodents	All year round	All over the State	V. Serious	N10,000,000.00
Aphids	Sept. - May	All over the State	V. Serious	N10,000,000.00
Army worms	June - August	Southern Borno	Mild	N. a.
Ball worms	Aug. - October	Southern Borno	"	N. a.
Caterpillars	July - Sept.	All over Borno	"	N. a.
White flies	July - August	All over Borno	"	N. a.
Nematodes	All year round	All over Borno	"	N. a.
Scale insect	All year round	All over Borno	Serious	N20,000,000.00
Locnis Rubens	August. - Sept.	Northern Borno	Mild	N. a.
Beettles (many types)	All year round	All over Borno	Serious	N11,000,000.00
Bugs (various types)	June - Sept.	All over Borno	"	N. a.
Ants and termites	All year round	All over Borno	"	N11,000,000.00
Stem borers	June - Sept.	All over Borno	Mild	N. a.
Crickets	June - Sept.	All over Borno	"	N. a.
Midges	August - Sept.	All over Borno	"	N. a.

N. a.: Not available.

Table 2.3 Plant Disease Outbreaks, Borno State, Nigeria

Disease Type	Time of Outbreak	Areas Affected
Rust	Epidemic outbreak 1990, 1991, 1992	Biu Local Govt. Area
Bacterial blight	Sporadic	Biu, Kwaya Kusar L.G.As.
Dawny mildew	"	Biu, Hawul L.G.As.
Tomato mosaic	"	Biu, Hawul L.G.As.
Rossettee	"	Hawul Local Govt. Area

2.3.10 Plant Pests and Diseases

The wide range of plant pests and diseases existing in Nigeria ensures that virtually all crops grown in the country are at some risk. It is not uncommon for whole crops such as maize to be wiped out in a Local Government Area, State or group of States by pest attack or for their yields to be severely curtailed. As an example, Table 2.2 shows reported pest outbreaks in Borno State in just one year, 1993, while Table 2.3 gives a rough picture of plant disease outbreaks, also in Borno State.

2.3.11 Wildfires

The Nigerian economy yearly incurs huge but unknown losses as a result of wildfire occurrences. These losses are for the most part imperceptible to the public who in ignorance of the full implications of their action set the bush ablaze for various reasons, including apparently trivial ones. The result is that the country looses valuable resources that could have been utilised for the improvement of the socio-economic conditions of its citizens.

A comprehensive survey of the effects of wildfires in seven southern states of the Federation has shown that the main area affected was 14.55% in 1982/83. This translated into financial losses of between N1.4 and N1.8 million (Tables 2.4 and 2.5).

2.3.12 Harmattan Haze

Harmattan haze is a threat to the entire population of Nigeria in the sense that it exacerbates respiratory ailments due to the trapping in the lungs of dust particles of less than two microns in diameter. The harmattan period is for this reason a really trying period for asthmatic people.

For the travelling public, harmattan haze is an important natural hazard, causing air crashes due to poor visibility. One of the worst air disasters in Nigeria occurred at Kano Airport in the morning of 22nd January, 1973 when harmattan haze reduced visibility to only 300m. A Jordanian airliner crashed, killing 176 people.

2.3.13 Landslides

Landslides are a very strongly localized phenomenon in Nigeria and so are the risks associated with them. These risks include:

- wholesale removal of valuable agricultural or forest lands;
- destruction of settlements located along big rivers; and

- blockage of roads by fallen debris which may result in road accidents.

Many of the riverside towns of Rivers and Delta States are threatened by river-bank erosion and landslides associated with it.

2.3.14 Earthquakes

No clear records exist of the casualty or property damage that may have resulted from the reported earth tremors in Nigeria. Reports have been made of collapsed buildings, injuries and even loss of lives. But such reports have not been confirmed. What is quite clear is that whenever earth tremors occur, they create fear and even panic among the people and these could lead to casualties.

Table 2.4 Wildfire Damage in Seven Southern States, 1983/84.

States	Total Established Plantation (HA)	Total Area Affected By Fire (HA)	Total Area Destroyed (HA)	% Area Destroyed
Ogun	6,704	6,704	495.8	7.4
Ondo	2,964	2,964	530.0	17.4
Edo/Delta	1,138	1,138	408.0	35.9
Rivers	90	90	31.5	35.0
Enugu/Abia	1,360	880	20.0	23.2
TOTAL	12,274	11,222	1,785.3	14.55

Source: Kio and Nnaobi *(Proceedings of the 20th Annual Conference of the Forestry Association of Nigeria*, 1990).

Table 2.5 Financial Losses Due to Wildfires in Seven Southern States, 1983/84

States	Area Destroyed (HA)	Financial Losses At N800/(ha)	Financial Losses At N6000/HA)
Ogun	495.8	N396,400.00	N495,800.00
Ondo	530.0	424,000.00	530,000.00
Edo/Delta	408.0	326,200.00	408,000.00
Rivers	31.5	25,200.00	31,500.00
Enugu/Abia	320.0	200,000.00	320,000.00
TOTAL	1,785.3	N1,426,240.00	N1,785,300.00

Source: As above.

3. MITIGATION ACTIVITIES

3.1 Status of Mitigation Activities

The status of activities which are designed to reduce the impact of natural disasters in Nigeria may be examined in terms of:

i. activities designed to meet the challenges of specific disasters; and

ii. activities which form broad frameworks for pre-ocurrence and post - occurrence response to natural disasters.

3.1.1 Activities to Meet Specific Disaster

3.1.1.1 Land Erosion

The following activities which will impact positively on the mitigation of land erosion have been embarked upon:

i. research on the phenomenon in various parts of the country;

ii. engineering soil erosion control projects in locations where this natural hazard poses a serious threat to settlements, infrastructures and livelihoods.

3.1.1.2. Floods

Various strategies and measures are being put in place to mitigate the incidence and impact of floods. These include:

- Construction of dams. Flood control has always been an important secondary objective for the construction of dams in Nigeria and has helped to reduce flooding in, for example, the Sokoto - Rima valley (Bakolori Dam; Goronyo Dam); the Niger Delta (Niger Dam, Jebba Dam, Shiroro Dam). The Gongola valley (Dadin Kowa Dam; Kiri Dam) and the Hadejia valley (Tiga Dam, Challawa Gorge Dam, etc.);
- Channelization of urban river channels (e.g the Ogunpa in Ibadan)
- Construction of drainage channels and canals (e.g. in Sokoto and Lagos respectively);
- Adoption of landuse plans for most urban centres;
- Commissioning of studies of flooding arising from uncontrolled released of water from the Ladgo Dam on the River Benue in Cameroun;
- Commissioning of studies of the potential impact in Nigeria of the Ladgo Dam, if it should fail.

Table 3.1 Selected Soil Erosion Control Projects of the National Committee on Ecological Problems.

Type of Project and Location	Funds Released as of june 1992 (Nmillion)	% Of Work done As OF June, 1992
Erosion control, Auchi (Edo)	3.1	50
Erosion control, Potiskum (Borno)	1.2	95
Erosion control, Ngwo (Enugu)	1.2	100
Erosion control, Abonena (Rivers)	7.9	100
Erosion control, Illaramokin (Ondo)	2.4	80
Erosion control, Bida (Niger)	35.0	50
Gully erosion control, Ohafia (Abia)	3.0	60
Gully erosion control, Effon Alaye (Ondo)	4.8	75
Gully erosion control, Ekwere Oboama Ezinhitte (Imo)	2.0	100
Gully erosion control, Igede - Ekiti (Ondo)	0.8	100
Soil erosion control, St. Luke's Hospital, Anua (Akwa Ibom)	2.5	100
Gully erosion control, Heiparg (Plateau)	1.1	100
Gully erosion control, Kuru (Plateau)	3.5	95
Soil erosion control, Obollo - Afor - Ikem	9.0	80
Soil erosion control, Murtala Mohammed Way, Calabar	10.0	60
Soil erosion control, Zangon Kataf (Kaduna)	7.5	20

Source: National Committee on Ecological Problems, *Preliminary Report to the President on the Approved Completion of Selected Ecological Problems*, 1992.

Table 3.2 Selected Flood Control Projects of the National Committee on Ecological Problems.

Location	Funds Released as of June, 1992	% of Work done as of June, 1992.
Ndiegoro, Aba (Abia)	9.5	100
Sambissa (Borno)	28.0	30
Rijau and Tunga Magajiya (Niger)	2.1	100
Dawaki - Bwoi	5.1	20

Source: As for Table 3.1.

3.1.1.3 Drought and Desertification

Like other forms of land degradation, desertification is induced by mismanagement of land resources which may aggravate the impact of drought. Therefore, Nigeria believes that better control of land and water resources is the most effective package of corrective measures for these twin environmental hazards.

In line with this and in her effort to ameliorate the effects of the drought and desertifications phenomena, Nigeria:

i. is paying greater attention to soil conservation and management;

ii. is promoting programmes that would encourage farmers to use hybrids resistant to drought;

iii. emphasises the use of water management projects, such as dams,to give sufficient water for all users, including livestock;

iv. has commissioned the drawing up of sectoral programmes to address the causes and consequences of desertification. These include reafforestation, afforestation, integrated rural development, capacity building of institutions and improved agricultural productivity of fragile lands; and

v. actively pursues with its neighbours policies which are designed to promote the management of international water bodies. Thus Nigeria is a member of the Chad Basin Commission and the Niger Basin Commission.

These and other measures formed part of a three-year (1990-92) rolling plan on desertification and erosion launched by the Federal Ministry of Agriculture and Natural Resources in 1990.

4.1.1.4 Human Disease Epidemics

Aids

In 1985, the government of Nigeria set up the National Expert Advisory Committee on Aids (NEACA). This was at the time the disease was first reported in the country. In 1988 it was replaced by the National Aids Committee (NAC) which is charged with the responsibility of controlling the disease in Nigeria.

The National Aids Committee, has its Headquarters in the Federal Ministry of Health and has the Honourable Minister of Health and Human Services as Chairman. It has a multi- sectoral and multi-disciplinary outlook. There are five Technical Advisory Committees for various activities, namely:

i. Epidemiology and Surveillance;

ii. Information, Education and Communication;

iii. Laboratory and Blood Safety;

iv. Clinical Management, Counselling, and Community House-based Care; and

v. Research.

Yellow Fever

Specific emergency preparedness against yellow fever epidemics should involve:

i. establishment of state or regional diagnostic centres;

ii. strenghtening the capacity of the Federal Vaccine Production Laboratory at Yaba;

iii incorporation of yellow fever immunisation into the EPI program;

iv. establishing an effective reporting system for both public and private health-care providers;

The difficulty in the control of yellow fever epidemics in Nigeria lies in the following:

i. There is usually considerable delay in notifying cases of yellow fever to public health authorities. In fact some cases are not notified at all by private hospitals.

ii. Specific laboratory tests for yellow fever diagnosis are available only at a few central locations. Some states have no histopathological laboratories or histopathologists at all to confirm post-mortem cases from liver tissue.

iii Despite the widely-recognised safety of the yellow fever 17 D vaccine, which has been available for over 50 years, it has not been included in the country's EPI programme.

iv Vaccine production, presently done at the Federal Vaccine Production Laboratory, Yaba, cannot meet the demand.

Cholera

Measures employed by the government of Nigeria to mitigate cholera epidemics include:

i. the production of cholera vaccine; and

ii the promotion of ORT to arrest diarhoea.

3.1.1.5. Coastal Erosion

The most important mitigation activity against coastal erosion has been artificial sand replenishment of beaches where erosion threatens expensive infrastructural facilities or prime urban land. Thus, in 1990 alone government deposited sand on the Victoria Beach at a cost over N300 million. Also noteworthy is the N8.5 million sand filling and shore protection project at Aban- Ama and environs in Okrika, Rivers State. Unfortunately such efforts have proved to be ineffective in the past because they were not based on adequate knowledge of the fundamental principles of ocean dynamics and shoreline processes of erosion and deposition.

3.1.1.6. Livestock Diseases

Mitigation measures which are already in place include the following:

i. the establishment of the National Veterinary Research Institute in Vom, Plateau State, charged with the responsibility of producing vaccines, carrying out diagnostic services, conducting studies on the immune status of animals and surveying disease outbreaks;

ii. the establishment of the National Livestock Diseases Reporting System to meet the need for information on the incidence, distribution and mortality rates of all livestock diseases in Nigeria; accumulate epizoological data to enable the development of improved control measures; facilitate our international

disease reporting obligations; provide guidelines for future research and vaccine production; and supply basic information for economic studies;

iii following the resurgence of rinderpest in 1980, the Federal Livestock Department was mandated to lead a National Campaign and appoint National and Zonal Co-ordinators;

iv. a special grant of N100 million has been set aside by the Federal Government for three years for C.B.P.P. control. So far N25 million has been released for the 1992/93 season;

v. Veterinary Control Posts have been set up throughout Nigeria as well as Border Posts to check the movement of livestock.

3.1.1.7. Wildfires

The indifference of Nigerians towards the wildfire hazard has long been recognised. Successive governments have shown concern over bush burning through the enactment of various legislations. Some of these legislations date back to the colonial days. However, these earlier legislations were faulty in design and implementation. The penalties were not commensurate with the magnitude of offences. Therefore, culprits would not mind repeating the same offence over and over again. As a matter of fact, the penalties have become more and more insignificant with the passage of time.

At present, increasing environmental concern and increased urbanisation have led to a modification of values in relation to fire legislation. In this regard, many State governments have promulgated updated edicts with a view to regulating bush burning. These edicts, with more realistic penalties, coupled with intensified campaigns in the print and electronic media, are gradually raising the consciousness of Nigerians to the hazardous effects of wildfires.

3.1.1.8 Harmattan Haze

The main mitigation strategy adopted so far is in respect of civil aviation. The national carrier, the Nigeria Airways, as well as some private airlines, routinely delay or cancel morning flights whenever harmattan haze reduces visibility down to a certain minimum level.

3.1.1.9 Earthquakes

In June 1985, a national seminar on earthquakes in Nigeria was held at the Ahmadu Bello University, Zaria, to examine the 1984 tremors

in all their ramifications and to allay the fears of the general public. Among the recommendations of the seminar were:

i. that the Federal Government should accelerate plans for the construction and maintenance of five adequately spread out, well- equipped seismological/geophysical observatories in the country;

ii. that the Federal Government should institute a nation-wide structural mapping programme to delineate areas of earthquake hazards, including areas of recent earth tremors; and

iii. that the Government should establish a national committee of specialists for earthquakes and for other natural hazards.

The Government had earlier in 1984 constituted a National Technical Advisory Committee on Natural Hazards which has been redesignated the National Technical Committee on Earthquake Phenomena (NTCEP). The Committee has three Sub-committees, viz;

i. Earthquake Phenomena Monitoring Sub-Committee;

ii. Standards Formulation Sub-Committee; and

iii. Hazards Management Sub-committee.

Among projects embarked upon by the National Technical Committee on Earthquake Phenomena are:

i. the production of a preliminary marine geophysical map of the continental margin of Nigeria;

ii. preliminary delineation of faults and fracture zones of the Nigeria land mass;

iii establishment of preliminary tidal co-efficients for the Nigerian coastal zone;

iv. preliminary compilation and analysis of airborne magnetic data over the continental margin of Nigeria;

v. monitoring of all reported geological hazards in Nigeria; and

vi public enlightment activities.

There had been only one seismological station in the whole country and it was stationed at ABU, Zaria. The station was established in 1984.

In 1987, the Geological Surveys Department of the then Federal Ministry of Mines, Power and Steel purchased six seismographs. These seismographs have been installed at Kaduna (1988), Ibadan and Ilorin (1989); Makurdi and Yola (1989); and Calabar (1990). The

seismograph at Ibadan recorded the last earth tremor which occurred in Ogun State in June, 1990.

3.1.2 Broad Frameworks for Natural Disaster Mitigation

3.1.2.1. Landuse Planning

Landuse planning is a very important tool in the mitigation of the impacts of natural disasters, such as tropical storms, land erosion, floods, desertification, coastal erosion, windstorms and landslides. The delimitation of natural hazard zones, for example, can form the basis of avoidance strategies.

In Nigeria, land-use planning as an activity geared towards natural disaster mitigation is still in its infancy. It is best developed in the main urban centres which now have masterplans that should form the basis of natural disaster reduction. Some urban centres also have building codes. Unfortunately, the implementation of the masterplans and building codes often leaves much to be desired. This it is not uncommon for development to spill over onto river flood plains, as at Ilorin, a clear invitation to disaster whenever a major flood event occurs in the relevant rivers.

3.1.2.2. Water Management

In the context of natural hazard mitigation, water management involves the development and control of water resources in such a way as to reduce the occurrence, magnitude and impact of hazards, such as flooding and erosion. Work is in progress on the drawing up of a National Water Resources Masterplan the objectives of which include flood and erosion protection and mitigation.

One of the functions of the River Basin Development Authorities is to undertake schemes for the control of floods and erosion and for watershed management. The many dams which have been put up by these Authorities and by other agencies have helped in the reduction of flooding, as in the Niger valley and the Hadejia valley.

3.1.2.3. Forest Management

Edicts and Bye-Laws against indiscriminate bush burning exist in most of the Local Government Areas of the country. But they are of little effect because the manpower needed to enforce them has not been mobilized.

3.1.2.4. Preparedness and Planning

Effective preparedness measures for natural disaster mitigation involve:

i. identification of the relevant natural hazards;

ii. vulnerability assessment, especially for areas of population and resource concentration;

iii. putting in place of mitigation measures that would lessen the impact of the hazards on lives and property;

iv. public enlightenment on the hazards, their potential impact and appropriate safeguards against and response to them; and;

v. setting up of a response plan which is well-rehearsed and which can be activated at short notice.

Furthermore, in order to ensure effectiveness, all these measures must be in place **before** rather than **after** a natural disaster occurs.

Efforts are being made to incorporate all these measures into our national action plan for the reduction of the impacts of natural disasters. In the meantime, the Federal Government has been alert to its responsibilities in the area of mitigating the effects of natural disasters through the establishment of:

i. the Nigeria Security and Civil Defence Corps;

ii. the Ecological Funds Office;

iii the National Committee on Ecological Problems (NCEP);

iv. the National Emergency Relief Agency (NERA);

v the National Strategic Grains Reserve

vi. the National Committee for Refugees;

vii. the Fire Service, and

viii.the Federal Environmental Protection Agency (FEPA).

In addition, there is a whole host of voluntary humanitarian outfits which perform crucial roles during and after disasters, man-made and natural.

Individually and collectively, these agencies, institutions and outfits provide emergency response whenever there is a natural disaster.

The Nigeria Security and Civil Defence Corps

One of the greatest calamities that have ever befallen Nigeria was the 3-year Civil War between 1967 and 1970. Conscious of its sacred responsibility to protect the civilian population, particularly in the then Federal Capital Territory of Lagos, the Federal Government of Nigeria set up the Lagos Security and Civil Defence Committee. The committee was to organise civil defence in Lagos and its environs. Over time, the Lagos Security and Civil Defence Committee expanded to other parts of the country and its name was changed to the Nigeria Security and Civil Defence Corps.

The Corps is a non-political, voluntary organisation affiliated to the Federal Ministry of Internal Affairs. It operates from its headquarters in Lagos under a Commandant-General with a State Command in nearly all the 30 States of the Federation. The Corps has regular members on its payroll who serve as security personal in sensitive areas. It also has branches in schools and universities where civil defence training is given.

Over time, the scope of the Corps' activities has been widened. Thus, when disasters strike, whether man-made or natural, the Corps steps in to assist in the evacuation and rehabilitation of survivors. Members of the Corps also monitor and report on hazards as well as security issues.

The Ecological Funds Office

Concerned about the prevalence of natural disasters in the form of erosion, flood, drought and desertification as well as technological disasters, such as industrial pollution and damage caused by bad agricultural practices and urban waste disposal, the National Assembly in 1981 passed an Act titled "Allocation of Revenue (Federal Account, etc.) Act 1981) 1982 No. 1)". The Act, which was amended by Decree No. 36 of 1984, set aside an amount equivalent to the value of 1% of the Federation Account to be paid into a fund to be administrated by the Federal Government for the amelioration of ecological problems in any part of Nigeria. This came to be known as the Ecological Fund. The Ecological Funds Office is in the Presidency.

The National Committee on Ecological Problems (NCEP)

Closely associated with the Ecological Fund is the National Committee on Ecological Problems Once the Ecological Fund was created

and an account opened for it, the Federal Government established the National Committee on Ecological Problems to administer it. The Committee consists of Directors General of Ministries with statutory responsibility for controlling ecological disasters under the Chairmanship of the Honourable Minister of Agriculture and Natural Resources. By 1991, the NCEP had disbursed over N1,437.64 million for the implementation of over 228 ecological projects in various parts of Nigeria. By 1992, the Federal Government of Nigeria raised the Ecological Fund to the equivalent of 2% of the Federation Account.

The National Emergency Relief Agency (NERA)

The National Emergency Relief Agency (NERA) was established by Decree No. 48 of 1976. The Agency was conceived as a corporate body with perpetual succession and a common seal and may sue or be sued in its corporate name. Its functions include:

i. the collection and collation of emergency relief supplies from local as well as foreign sources, governmental and non-governmental;

ii. the distribution of such emergency relief supplies in any area of Nigeria affected by a natural or man-made disaster;

iii. receipt and disbursement of financial, material and technical aid to distressed victims of disasters locally and internationally; and

iv. the determination of emergency relief operations and priorities of the Federal Government of Nigeria.

After having been placed under different Ministries at different times, the Agency was finally transferred to the Presidency in the Office of the Secretary to the Government of the Federation in 1992.

States and some Local Governments in the country have set up parallel bodies known as State Emergency Relief Agencies (SERA) or Local Emergency Relief Committees (LERC), respectively.

The State and Local Governments look up to the Federal Government for financial and material support to enable them respond effectively to their victims of disasters. This leaves the Federal Government to principally bear the responsibility of funding disaster relief in Nigeria. This it does through NERA.

Apart from billions of Naira disbursed to victims of natural disasters and of civil strife and to Nigerian refugees from foreign countries as well as in the form of grants to State Emergency Relief Agencies, over

N200m worth of relief materials was given to sister African countries in 1992 alone.

The National Strategic Grain Reserve

This was created in the wake of the drought of the early 1970s which caused widespread famine, especially in the northern parts of the country. It consists of strategically-located stores of maize, guinea corn and cow peas which are released to disaster victims both as food and as seed for planning.

The National Commission for Refugees

Disasters arising from civil strife, economic crises and natural hazards often result in population movements which create refugee problems. The influx of refugees into Nigeria from neighbouring countries as a result of natural or man-made disasters has persisted for a long time, accentuating the need for a framework to handle the problem. In due consultation with the United Nations High Commissioner for Refugees and the Organisation of African Unity Commission of Fifteen on Refugees, the Federal Government of Nigeria promulgated the National Commission for Refugees Decree No. 52 of 1989. The Commission, under the supervisory authority of the Secretary to the Government of the Federation, was inaugurated on the 29th of August, 1991. The Commission, which is chaired by a senior Judge, has members that include the Directors-General of Political Affairs in the Presidency, the Ministry of Foreign Affairs and of Internal Affairs. It has the United Nations High Commissioner for Refugees as an observer. The functions of the Commission include, among others:

i. laying general guidelines and overall policy on general issues relating to refugees and persons seeking asylum in Nigeria;

ii. advising the Federal Government on policy matters in relation to refugees in Nigeria; and

iii. considering such matters as the Secretary to the Government of the Federation may, from time to time, refer to it and making recommendation thereon to him.

The Commission has an Eligibility Committee and an Appeal Board. A Federal Commissioner for Refugees manages the Commission on

a day-to-day basis. The duties of the Commissioner for Refugees include:

i. granting refugee status to applicants on the recommendations of the Eligibility Committee;

ii. registering persons who have been granted refugee status;

iii. presiding over committees on refugees as may be appointed from time to time by the Commission;

iv. ensuring the provision of adequate facilities and services for the reception and care of refugees in Nigeria;

v. taking steps as he considers necessary to ensure that no person who is a refugee is refused entry into Nigeria, expelled, extradited or returned in any manner whatsoever to the frontiers of any territory where:

   a. his life or freedom would be threatened on account of his race, religion, nationality, membership of a particular group or political opinion; or

   b. his life, physical integrity or liberty could be threatened on account of external aggression, occupation, foreign domination or events seriously disrupting public order in any part or the whole of that territory.

The commission is fully operational and has in its refugee camps around the country thousands of refugees, mainly from Liberia, Chad

The Fire Service

One of the very important disaster reduction outfits in Nigeria is the Fire Service. The Fire Service all over the world provides services beyond just first-fighting which their bane suggests. The Fire Service in Nigeria has basic functions of saving lives and property and providing humanitarian service in virtually all instances of disasters. It undertakes fire- fighting, as well as search-and-rescue operations in water, air and road accidents, building collapse, earthquakes, floods, landslides, etc. Where necessary, the Nigeria Fire Service co-operates with the Police, Navy, Air Force and the Army to provide emergency response during disasters.

The Fire Service in Nigeria was established as far back as 1906 as the Police Fire Brigade. The Federal Fire Service, as it is now known, is

still restricted to the Federal Capital Territories of Lagos and now Abuja. It is the only paramilitary service that has not been centralised. The Federal Fire Service has variously been placed under different Ministries. It is now placed under the Federal Ministry of Works and Housing. All States of the Federation have their own fire-fighting outfits. The only forum for consultation between the Federal and State fire-fighting outfits is the Annual National Conference of Nigerian Fire Service Directors, chaired by the Director, Federal Fire Service. Inter-service assistance is feasible through a system of HF radio linkage between the five zonal stations of Kano, Bauchi, Abuja, Calabar and Oyo and the main station at Lagos.

Plans have been concluded to establish a Fire Service Technical College in Abuja, the new Federal Capital.

The Federal Environmental Protection Agency (FEPA)

The rapid socio-economic and physical development of Nigeria saw a high rate of population increase, greater demand on natural resources, haphazard urbanisation and inadequate infrastructural amenities. The scourges of drought, desertification, erosion and flooding with the attendant threats to food security and shelter intensified. Industrial pollution, internal and international waste disposal problems, non-sustainable patterns of energy use and increasing energy demand as well as global environmental problems also posed a great threat to the nation's environment and life- support system. Taking cognisance of the above, the Federal Government of Nigeria established the Federal Environmental Protection Agency (FEPA) through Decree 58 of 1988. The Agency, as an autonomous body in the Presidency, is charged with the responsibility of protecting the environment and conserving the natural resources of Nigeria.

In its short period of existence, the Agency has adopted the most pragmatic approach to the management of disasters by upholding the precautionary principle. FEPA has laid for Nigeria a solid foundation for sustainable development - development that takes into account the carrying-capacity of the physical and biological environment. At the very centre of this approach is the institutionalisation of environmental impact assessment (EIA) for all major projects.

The National EIA Decree, which has been enacted, requires that all public and private projects undergo environmental screening and projects such as large-scale agriculture, irrigation, major industrial

installations, dams, mining activities, pipelines, power plants, major road construction projects will have to be preceded by Environmental Impact Assessment (EIA). This will, of course, primarily consider the potentials of such projects to trigger off such natural disasters as coastal erosion, land erosion, flooding, etc.,

The Agency, apart from being the apex national environmental body, also doubles as the Secretariat and Focal Point for co-ordinating natural disaster activities under the IDNDR. In this capacity, the Agency has been working with the relevant disaster - related bodies at the national and international levels to ensure the achievement of the goals and objectives of the Decade in Nigeria. The Agency was recently expanded to absorb national outfits responsible for desertification, drought, flood, and erosion control as well as outfits for resource mapping and remote sensing. This has placed it as the focus for both natural and technological disaster mitigation activities in Nigeria.

Voluntary Humanitarian Outfits

Nigeria has a number of philanthropic and humanitarian outfits of voluntary nature. These include the International Red Cross and Crescent, the Nigerian Red Cross Society, the Aid Groups of many Muslim Associations, the Boys Brigade, the Salvation Army, the Boys Scout and Girls Guide, St. John's Ambulance, etc. These outfits are always readily available in times of disaster to assist in evacuation, first aid, rehabilitation and distribution of relief materials. The organisations have memberships cutting across age and are structured hierarchically down from the Federal through the State to Local levels. They have branches in Schools and Colleges.

3.1.2.5. Awareness and Training

People's awareness of some of the natural hazards in Nigeria is quite well developed, thanks to their experience of them, and media campaigns. This applies in particular to land erosion, drought and livestock diseases. However, knowledge and adoption of appropriate coping mechanisms for these hazards remain low. Peoples awareness of other environmental hazards still has to be promoted. Prior to 1990, public awareness activities were handled by the different disaster mitigation outfits. The launching of the IDNDR and the adoption of the second Wednesday of October each year as the International Day for Natural Disaster Resduction added some

impetus to awareness campaigns on natural disaster reduction. Every year since 1990, the Secretary of the Nigeria IDNDR Committee has organised a series of awareness activities sometimes stretching over a fortnight to mark the Day. Such activities include, press briefing symposia, exhibitions, poster displays, radio jingles and documentaries, as well as simulation and drills.

4. WARNING

Warning systems have a very important role to ply in the reduction of the impact of natural disasters. If the incidence of such disasters can be predicted, it may by possible to adopt avoidance strategies, for example, whereby populations at risk may be evacuated.

From the point of view of warning systems, natural hazards in Nigeria may be divided into four groups:

i. meteorologically-related hazards, including tropical storms, floods, drought, coastal erosion, windstorms, harmattan haze, wildfires and certain human disease epidemics, such as cerebro-spinal meningitis;

ii. geologically-related hazards, including land erosion, landslides and earth tremors;

iii. biologically-related hazards, including human disease epidemics, plant pests and diseases and livestock diseases; and

iv. other hazards, including desertification.

4.1. Warning Systems for Meteorologically-Related Natural Hazards

In tropical areas, rainy season weather systems which generate natural disasters are notoriously difficult to predict. Therefore, the putting in place of effective warning systems for meteorologically-related natural hazards, such as tropical storms, floods, drought, coastal erosion and windstorms, is an uphill task. Such warning systems must be based on a network of functional Upper Air Stations and must have the capacity to benefit from modern satellite technology.

The Meteorological Department is one of the country's oldest government departments. But it is poorly placed to make relevant meteorological observations and offer useful forecasts for the country's natural disaster reduction efforts. Of its 42 monitoring stations only two are fully functioning. Of its 6 Upper Air Stations (at Oshodi, Port-Harcourt, Kano, Minna, Enugu and Kaduna) only one is in working order. Funds are urgently needed to procure or repair equipment, improve existing infrastructures and establish more weather stations. Two International Weather Stations are under construction at Ikeja and Lagos, sponsored by the EEC.

The underdeveloped status of meteorological services in Nigeria means that almost all the relevant natural hazards remain relatively unpredictable. Exceptions are harmattan haze, wildfires, and cerebro-spinal meningitis for which knowledge of either the general period of occurrence (harmattan haze) or of the predisposing atmospheric conditions (wildfires and CSM) may be sufficient to take appropriate action.

4.2. Warning Systems for Geologically - Related Natural Hazards

The only noteworthy development here is the establishment of a National Technical Committee on Earthquake phenomena whose work has been reported in Section 3.1.1.9.

4.3 Warning Systems for Biologically - Related Natural Hazards

Private and government health centres, clinics and hospitals are expected to report the outbreaks of human disaster epidemics to the Epidemiological Units of the State and Federal Ministries of Health. Unfortunately, such reports are either not made at all or not made in good time.

Outbreaks of epidemics in livestock are monitored and reported by the field stations of the Veterinary Research Institute, Vom, as well as the Federal and State Livestock Departments. Those of plant pests and diseases are reported by the field stations of the Ministries of Agriculture.

4.4. Warning Systems for Desertification

Desertification is normally a slow process which may be difficult to monitor. In Nigeria appropriate monitoring systems are yet to be designed and put in place to send signals out before the problem assumes disaster proportions.

5. INTERNATIONAL CO-OPERATION

Nigeria's international co-operative efforts in fulfilling the IDNDR goals include:

5.1. Contact With the DHA and the IDNDR Secretariat

Nigeria has always maintained keen interest in the activities of the UNDRO. It benefited from UNDRO's updates and warning systems, particularly its locust and drought alerts. It was in the course of this information exchange that Nigeria came to know more fully of the IDNDR and its objectives and goals. The creation of the DHA in 1992 was a welcome development. Nigeria has since established correspondence with the DHA and especially the IDNDR Secretariat. We are kept abreast of developments at those ends and on our part we have tried to fulfil our commitments, including:

i. contributions to the UNDRO Trust Fund;

ii establishing the National Committee on the IDNDR;

iii. annual observation of the International IDNDR Day; and

iv. national preparation for the 1994 World Conference on Natural Disaster Reduction holding in Japan.

5.2. Bilateral Co-operation

Nigeria's Committee on the IDNDR is one of the first to be established in pursuit if UNGA Resolution 44/236. Since its inauguration, the Committee has been interacting with other National Committees. This interaction has essentially been in the form of information exchange. Nigeria has acquired valuable information from the U.S.A., Netherlands, German and Japanese IDNDR Committees.

At the bilateral level also, Nigeria has responded to calls for disaster relief assistance to other nations, particularly in Africa. Such assistance was given when a devastating earthquake hit Egypt in 1993, and also when drought occurred in Somalia and Chad.

5.3 Regional and Sub-regional Co-operation

A number of cross-boarder disaster situations exist the control of which necessarily requires the co-operation of two or more nations. Control of migratory locusts, livestock diseases and some human disease epidemics are example of mitigative activities which Nigeria has undertaken along with neighbouring countries at sub-regional

levels. Nigerian scientists participated in the scientific panel set up to investigate the gaseous explosion on Lake Nyos in Cameroun. In 1993 an International Workshop on Natural and Man-made Hazards was organised by the Nigeria Mining and Geosciences Society which attracted participants from neighbouring countries. Later in the year, Nigeria participated in an Expert Meeting in Addis Ababa, to articulate an African regional input for the 1994 World Conference on Natural Disaster Reduction.

Nigeria has participated in all global fora on the problems of drought and desertification. At negotiations for the recently- concluded 1992 Earth Summit, Nigeria was one of the prime movers for adequate provisions to be made in the Agenda 21 programmes and for a convention on drought and desertification. We are also a very active participant in the on-going negotiation to elaborate an international convention to combat desertification in those countries experiencing serious drought and desertification, particularly in Africa.

5.4. Technical Assistance for Specific Disasters

Nigeria has benefited from a number of bilateral and multilateral agencies in a number of fields. A few of these are given in Table 5.1

Table 5.1 A Sample of Technical Assistance Given to Nigeria by Bilateral and Multilateral Agencies.

Area of Co-operation	Co-operating Partners	Activity
Human Disease Epidemics	EEC	Primary health care (PHC); Aids control
	WHO	Capacity building for the health sector
	UNICEF	EPI/ORT
	USAID	PHC
	Global 2000	Guinea worm control
	World Bank	Capacity building
	UNPF	Child health
	Brazil	Yellow fever control
Drought and desertification	EEC	Afforestation
	World Bank	Fadama irrigation
	Japan	Afforestation
Agricultural Pests	EEC	Pan-African Rinderpest Campaign

5.5. DHA Regional Office for Africa

Nigeria looks forward to greater co-operation with the DHA and the IDNDR Secretariat. We call for the location of regional offices in Africa to facilitate this . We are convinced that Africa stands to benefit tremendously from the establishment of a regional DHA office on the continent. There is no doubt that this continent, which is in crisis in several respects, deserves ready access to DHA services.

6. OVERALL EVALUATION AND FUTURE PROGRAMME OF IDNDR ACTIVITIES

6.1 Achievements of the First Half of the Decade

In Nigeria considerable progress has been made, some of it during but much of it before the beginning of the Decade, in the following areas:

i. identification of natural hazards and assessment of their geographic distribution;

ii. general assessment of the vulnerability of people and resources to these hazards;

iii. putting in place of outfits which can provide relief when a disaster occurs;

iv. establishment of institutions and agencies charged with the responsibility of warning the nation whenever certain disasters strike; and

v. raising community awareness of some natural hazards.

6.2 Expectations and Plans for the Second Half of the Decade

A great deal needs to be done in order to fully meet the objectives of the Decade. These are in the areas of assessment, warning, preparedness and the co-ordination of emergency assistance.

6.2.1 Assessment

There is need for:

i. location and delineation of natural hazards zones at national, regional and local levels;

ii. establishment of levels of actual risk and of acceptable risk limits; and

iii. production of natural hazard maps of Nigeria.

6.2.2. Warning

6.2.2.1. Monitoring

Efforts need to be geared towards:

i. establishing physical and biological desertification indicators in Nigeria;

ii. strenghtening the hydrometeorological station network in Nigeria;

iii. building of capacity to receive, decode, analyse, and interpret satellite imagery for weather forecasting and land evaluation;

iv. enhancement of the existing seismic stations and establishment of a seismological centre in the country;

v. strengthening of the Remote Sensing Centre;

vi. studies of the factors at play in the coastal morphogenic system with a view to using these in the design and implementation of ameliorative measures against coastal erosion; and

vii. establishment of an etiological unit in the Epidemiological Unit of the Ministry of Health and of a Pest Monitoring Unit in the Ministry of Agriculture.

6.2.2.2. Early Warning and Dissemination

There is need for:

i. development of standard symbols and jingles to warn on impending disasters and raising of public awareness on their use;

ii. establishment of early warning facilities in vulnerable areas and training of personnel for the stations;

ii. inclusion of disaster warning in the schedules of the national radio and television networks;

iv. mobilization of the traditional information dissemination system for disaster warning;

v. provision of modern communication systems - HF, VHF, satellites; fixed and mobile, etc.

6.2.3. Preparedness

Action is required in the following areas:

i. evolution of a National Plan of Action for Natural Disaster Reduction, with emphasis on preparedness.

ii. capacity building for all outfits engage in disaster mitigation, such as FEPA, Civil Defence, NASENI, Fire Service, Ministry of Works and Housing, Ministry of Health and Human Service, etc.

iii. review of all existing legislation on disaster mitigation with a view to stream-lining, harmonising and enhancing them for effectiveness;

iv. integrating disaster mitigation considerations into national development policies, such as the inclusion of disaster potentials in the EIA protocol; and

v. encouraging insurance agencies to promote insurance policies against natural disasters.

6.2.4. Co-ordination of Emergency Assistance

There is need for:

i. the establishment of a National Emergency Response Committee to provide co-ordinated early intervention following the incidence of disasters;

ii. the designation of a National Medical Emergency Centre and its networking of all medical facilities in Nigeria;

iii. capacity building/establishment of tertiary hospitals for spinal cord injury, trauma, burns, orthopaedic, cardiac and plastic surgery services;

iv. strenthening the National Emergency Relief Agency to enable it adequately handle material and financial relief to disaster victims; and

v. training and regular drill (simultation) by emergency outfits and the general public.

APPENDIX 1

SUBCOMMITTEES OF THE NATIONAL COMMITTEE FOR THE IDNDR

1. Desertification, Drought and Wildfires

Membership:

Ministry of Agriculture, Water Resources and Rural Development – Chairman
National Agency for Science and Engineering Infrastructure
Federal Meteorological Department
Federal Environmental Protection Agency (FEPA)
National Emergency Relief Agency (NERA)
Nigerian Institute for Social and Economic Research (NISER)
Nigeria Security and Civil Defence Corps (NSCDC)

2. Erosion, Landslides and Earthquakes

Membership.

National Agency for Science & Engineering Infrastructure – Chairman
Nigerian Institute of Oceanography and Marine Research (NIOMR)
Federal Ministry of Works and Housing
Federal Ministry of Transport
NSCDC
NICON
NIDB
FEPA
NERA
Red Cross

3. Flood, Wind and Rainstorms

Membership:

Federal Meteorological Department – Chairman
Federal Ministry of Foreign Affairs
Federal Ministry of Transport
Civil Defence Corps
Federal Ministry of Works and housing
NIOMR
NICON
FEPA
NERA
Red Cross

4. Epidemics and Pest Invasion

Membership:

Federal Ministry of Health and Human Services – Chairman
Federal Ministry of Agriculture, Water Resources and Rural Development
Federal Ministry of Internal Affairs
National Agency for Science and Eng. Infrastructure
Federal Ministry of Foreign Affairs
Red Cross
NICON
FEPA
NERA

5. Information and Public Enlightenment

Membership:

Federal Ministry of Information and Culture – Chairman

FEPA

Federal Ministry of External Affairs

Red Cross

NISER

NICON

NSCDC

NTA

FRCN

APPENDIX 2

MEMBERSHIP OF NIGERIA WORKING GROUP ON NATURAL DISASTER REDUCTION

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Alh. B. A. Asafa The Head, Natural Resources Conservation, Federal Environmental Protection Agency (FEPA), Abuja.	**Member**
Dr. D.T. Gowon The Director, Soil Erosion and Flood Control, Federal Environmental Protection Agency, Abuja.	**Member**
Ms A. Ene-Ita Planning, and Evaluation, Federal Environmental Protection Agency, Abuja.	**Member**
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Mr M. M. Omar Federal Environmental Protection Agency, Abuja.	**Secretary**
Mr. L. E. Akeh Federal Meterological Dept. Ministry of Transport and Aviation Oshodi - Lagos.	**Member**

APPENDIX 3

RESOURCE PERSONS FOR THE REPORT

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Printed by Darex Printarts NC 16 Muri Road Kaduna Nigeria ☎ 062-211077, 212494