

ENVIRONMENTAL CRISIS AND DEVELOPMENT IN NIGERIA

An Inaugural Lecture

By

ADEMOLA TOKUNBOH SALAU

Professor of Geography
Deputy Vice-Chancellor
University of Port Harcourt
Nigeria

Delivered on Thursday, 11th February, 1993

At the

University of Port Harcourt

University of Port Harcourt

Inaugural Lectures Series

No. 13

1993.

DEDICATION

This lecture is dedicated to Eme Ekekwe and the 25 men and women who gathered on 17th July, 1987 at a meeting in Ibadan which gave birth to an environmental pressure group called NEST (NIGERIAN ENVIRONMENTAL STUDY/ACTION TEAM).

AND

TO A GREENER AND GREATER NIGERIA

Vice-Chancellor

Registrar and other Principal Officers of the University

Deans of Faculties and Provost, College of Health Sciences

Professors and Heads of Departments

Distinguished Ladies and Gentlemen

It is indeed a great honour for me to stand here before you this evening to present the first inaugural lecture emanating from the Faculty of Social Sciences. It is also with a deep sense of humility that I represent this faculty which has contributed in a major way to the high reputation being enjoyed by this citadel of learning, this “Unique Uniport” today.

The Faculty of Social Sciences is indeed very proud that its Foundation Dean, Professor Claude Ake, is the second National Merit Award Winner from this University. His successor as Dean, equally a giant scholar, was Professor Ikenna Nzimiro, a member of the Presidential Advisory Committee for the past seven years. For those who may be unaware of this fact, the Orchards at the University Park are the handiworks of another former Dean of ours, a humane and brilliant man of letters in the person of Professor K.L.S Kodjo. Professor Kodjo who is now the Dean of the Faculty Sciences Economiques et Sciences Gestion at the Universite du Benin, Lome, Togo; devoted almost two decades of his life to the upliftment of higher education in Nigeria (first at the University of Nigeria and then at this University). Of course, the present Dean, Professor Olatunde Ojo left the comfort of the University of Ife (now called Obafemi Awolowo University) to join Professor Donald Ekong (the first Vice-Chancellor) in building a new University. His invaluable contribution as the first Dean of Student Affairs and Director of Studies (Political Science) needs no embellishment. I salute all these men.

The first dilemma facing an inaugural lecturer is the choice of a topic. It is customary that the chosen topic highlights a particular problem in which the

discipline to which the lecturer belongs has contributed towards resolving. The second problem relates to the need to present the lecture in a less arcane language. It is not always easy to resolve these problems. During my preparation for this lecture, I read many inaugural lectures previously delivered in some Nigerian Universities. One cannot but be impressed with the ingenuity of some lecturers in resolving these problems through their choice of topics. One can imagine how difficult it must be for a mathematician or a physicist for that matter to write a lecture comprehensible to the rest of us laymen. Fortunately my discipline is much more accessible. Nonetheless, I had a difficult time deciding on a topic for this lecture.

I am fascinated or perhaps intrigued is the better word for the experiment in political engineering being undertaken by the Babangida administration over the past seven years. As political geography is one of my areas of interest, I had thought that in view of the majority of Nigerians' current preoccupation with this experiment, nothing could be more timely than a lecture in this area. I had started writing the paper and had indeed gone far before I succumbed to my wife's superior judgement that I should speak today on a topic which is much more fundamental to our future on this planet than on an ephemeral issue of political succession.

As the process of national development entails the planned exploitation of the natural resource endowments for achieving a higher standard of living for the people, development prospects of a country therefore depend to a great extent on its natural resource base – soils, atmosphere, water and vegetation. Owing to the seemingly abundant initial supply of these resources and their relatively easy accessibility in most developing nations, they are taken for granted and are often used as if they are inexhaustible. While by the late 1970s the issue of environmental protection and conservation of natural resources had captured the popular imagination in the more advanced

countries, environmental awareness did not feature; prominently in the scheme of things in most developing nations. This was due in part to the fact that the developing nations face more urgent problems of how to satisfy the immediate basic needs of the people and to generate faster rate of economic growth. Indeed some felt that concern for the environment was premature for poor developing countries still trying to throw off the shackles of poverty and underdevelopment. The lukewarm attitude to environmental issues in the developing nations also stemmed from the fact that environmental crisis is largely a product of industrial development and the initial impetus and orientation of the environmental movement in the more advanced countries was “anti-growth and anti-industrial development” (Shanmugaratnam, 1989). This was thus seen as a luxury developing nations could ill-afford.

However, within the past decade most developing nations have been faced with conspicuous effects of environmental degradation and thus ecological awareness has risen. Indeed many have come to realize that environmental degradation may turn out to be the ‘Achilles heel’ of development as it arrests or wipes out whatever little gains already made. It is thus not surprising that harmonization of development and environmental objectives have also found widespread resonance in developing nations. However, in spite of this realization there is still a wide gap between pronouncement or policy objectives, actual commitment and results. The institutional framework for coping with environmental problems as well as associated policies and programmes are also often grossly deficient and ineffective.

The potential for environmental disasters now hang so ominously over Nigeria. The country is now painfully and sadly becoming more aware of the gravity of the situation as stories of floods killing hundreds and destroying valuable properties, gully erosion overtaking villages and farms and blowouts and

spillages from oil exploitation endangering many rural and fishing communities, have become very prominent in the daily newspapers. Perhaps more important is the realization that if nothing is done quickly and with the nation's population increasing, land use becoming more intense and resource conversion capabilities rising, the problem is bound to worsen. Indeed a World Bank (1990) study indicates that actions to arrest environmental degradation in Nigeria must be given an utmost and urgent priority. The study provides an estimate of the magnitude of losses that can be expected to the Nigerian economy if no action is taken to arrest the prevailing environmental/natural resource degradation. Aggregating all of the sources of environmental degradation, complete inaction would involve ultimate long term losses estimated to be more than five billion dollars (about 100 billion naira) per annum (Table 1). This is a staggering amount and gives an indication of the need for immediate and effective actions. Thus my lecture today seeks to examine the nature and the factors responsible for the threat to our environment in Nigeria and what can be done to ameliorate the situation.

My discipline – geography – is a much misunderstood subject and thus I would not be surprised if there are some in the audience wondering and asking what has geography got to do with the environment. To some people, geography is mainly concerned with the drawing of maps and learning weird names of places and physical features like mountains and rivers. To others, an encounter with geography in the secondary school or in their freshman year in the University had left them breathless and with an indelible impression of geography as an abstruse discipline. Although geography has no unique claim to environmental competence, it is difficult to find another discipline whose major preoccupation with the understanding and interpretation of the relationships between man and his environment is higher. The fact that geography has connections with virtually all other disciplines can also be

regarded as providing geographers with the kind of multidimensional vision, catholicity, and eclecticism necessary for the study of environment with its inherent complexity (Haggett, 1972; Manners and Mikesell, 1974). In this lecture, I have drawn freely from the fruits of various activities I had engaged in within the past few years.

**Table 1: Estimate of Long-Term Losses
Associated with National Resources
Degradation in Nigeria**

	ECONOMIC GROWTH	DISTRIBUTIONAL EQUITY		RESOURCES INTEGRITY	
	Estimated \$ NNP Impact Millions	Population level at risk	Population Wealth Indicator (O= rich) (+ = poor)	Environment Quality & Human Health at risk (O - low + high)	Renewable Resource Integrity at risk (O – low = high)
	US\$/Year (Dollars)	(Millions)			
Soil					
Degradation and Loss	>3.000	50	2.3	3	3.4
Ground & Surface Water Contamination	>1.000	>40	3.4	3.4	(3)
Deforestation	>750	50	2.3	(2)	4
Costal Erosion	ca.150	<3	3	2.3	2
Gully Erosion	ca.100	<10	2.3	2	3
Fisheries Losses	ca.100	<5	3	(0:n.a)	4
Wildlife & Biodiversity Losses	ca.10 (excl. Biodiversity)	<1	2	(0:n.a)	4
Air	not				

Pollution	estimated	35	4	2.3	(1)
Water Hyacinth	ca.50	5	2.3	2.3	(0:n.a)
	n.a	-	not applicable		
	()	-	figures in square bracket are indicative only of Potentially related resources.		
	Source:	-	World Bank (1990 : 39)		

DEVELOPMENT AND THE ENVIRONMENT

Man and his environment are inseparable and the relationships between them are very intimate and dynamic. It is from the land, air, and water (the physical environment) that resources for human needs are derived. As man affects the quality of the environment, so the environment affects the quality of man's life. Human well-being is inextricably linked to continued availability of natural means of support and this implies that any threat to the security of these resources constitutes a direct threat to human survival and development. Thus Water Rodney (1982:10) was not off the mark in defining development as follows:

“A society develops economically as its members increase jointly their capacity for dealing with the environment. This capacity for dealing with the environment is dependent on the extent to which they understand the laws of nature (science), on the extent to which they put that understanding into practice by devising tools (technology) and on the manner in which work is organized.”

Although it is true that economic growth places pressure on the natural environment, the question is whether there is a built-in conflict between output growth and environmental protection and improvement. In other words, as the earth's resources are finite, particularly its absorptive capacity or

“sinks”, can we continue to indulge in our insatiable appetite for growth? There is no doubt that there are limits to exponential growth but the question is whether these limits have been reached and if economic growth is the cause.

However, it is now recognized that economic growth per se is not the problem but a particular model of economic growth. What is needed is a growth process that will be compatible with the environment or what has now been popularized as sustainable development. According to the Brundtland Commission (WCED, 1987), sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The critical objectives for environment and development that follow from the concept of sustainable development include (WCED, 1987:49):

- reviving growth;
- changing the quality of growth;
- meeting essential needs for jobs, food,
- energy, water and sanitation;
- ensuring a sustainable level of population;
- conserving and enhancing the resource base;
- reorienting technology and managing risk; and
- merging environment and economics in decision making.

Perhaps more importantly, from the developing nation’s point of view, is the recognition by this concept that economic growth is absolutely necessary for sustainable development but that the only thing that needs to be done is “to change the quality of (that) growth” so as to ensure that it does not lead to environmental degradation. This conforms to the growing consensus that “many environmental problems in developing countries originate from the lack of development that is from the struggle to overcome extreme conditions of poverty” (Bartemus, 1986:18). Protection of the environment is also seen as

essential part of development. Without adequate environmental protection, development is undermined and without development to make available resources needed for investment, environmental protection will fail. Thus economic growth depends to a great extent on the maintenance of environmental quality and environmental well-being of the people. A World Bank study (1992:10) illustrates how rising economic activity “can cause environmental problems but can also, with the right policies and institutions, help address them”. Three patterns are recognized in this relationship as follows:

- 1) Some environmental problems decline as income increase. This is due to the positive synergies between economic growth and environmental quality in which increasing income provides the resources for public service such as sanitation and rural electricity and when individuals no longer have to worry about day-to-day survival and thus can devote resources to profitable investments in resources conservation.
- 2) Some ecological problems initially worsen but then improve as incomes rise. Most forms of air and water pollution, some types of deforestation and encroachments on natural habitats belong to this category. However, this is not an automatic process as it occurs only when countries deliberately introduce policies to ensure that additional resources are devoted to dealing with environmental problems.
- 3) Some indicators of environmental stress worsen as income rises. Examples of such problems are emissions of carbon and nitrogen oxides and municipal wastes.

However, as the World Bank study points out, this outcome is only possible and not inevitable. The answer therefore lies in designing and implementing appropriate policies.

ECOLOGICAL CRISES IN NIGERIA

The litany of ecological woes besetting our country today is very long indeed. These problems are now compounded by the emergence of other environmental challenges which are global in nature and whose impacts threaten the very survival of mankind. These global environmental problems, the major ones which are global warming, ozone depletion and loss of biodiversity, have illustrated in a vivid manner the fact that the destiny of mankind is bound together as we all live in one spaceship earth. These global environmental threats will have a far reaching effect on this country and thus the need for Nigeria to join other nations in the search for solutions. These global environmental challenges raise many other serious issues but we will not let these debar us here as they have been addressed elsewhere (See Salau, 1992:1993 a & b).

In this lecture, we are going to concentrate on the so called “local environmental problems”. These problems will be examined in a way which does not strictly suggest any particular order of their importance or gravity. A preliminary attempt in this respect has already been made as earlier pointed out (Table 1).

For ease of analysis, six broad aspects of the ecological crises which will be examined in this lecture are:

- (a) Drought and desertification,
- (b) Soil erosion,
- (c) Deforestation,
- (d) Land and water pollution,
- (e) Air pollution, and
- (f) Solid waste disposal.

DROUGHT AND DESERTIFICATION

Desertification in the country is currently most prominently manifested in the semi-arid zone of the country which is a transitional zone between the humid areas to the south and Sahara Desert to the north extending from about latitude 12°N north-wards. This area is populated by more than 28 million people and 58 million livestock and includes substantial parts of Borno, Kano, Katsina and Sokoto states and a small portion of Bauchi State (NEST, 1991).

There is however still a controversy as to the rate of progression of desertification in Nigeria. This is due to the fact that estimates of the rate of desertification are a very complex exercise which involves many feedback mechanisms. The result is that some of the claims are very subjective, contradictory or downright alarming. For example, some government officials in Kano State have estimated the rate of progression as between eight and ten kilometres per year while the rate of between eleven and fifteen kilometres per year have been estimated in Sokoto State. (Daily Times, 13 June, 1988). Whatever be the case, there is a consensus that the problem is serious and may be getting worse. Perhaps more important is the devastation and human sorrow engendered by drought and desertification (Mortimore 1985). Assuming the rate of desertification at between 500 and 800 metres a year, one scholar estimated the possible annual loss of arable land in the worst affected areas at more than one hundred square kilometre per year (Table 2).

Table 2: Possible Annual Loss of Arable Land to Desertification in Nigeria

States	Area in Km ²	Area of Arable Land Loss per annum in km ²
Sokoto	103,500	160-258
Katsina	24,232	78-125
Kano	42,562	103-165
Borno	117,504	171-274

Source: Oladipo (1989)

The problem of drought is countrywide and not restricted to the northern part like desertification. Drought constitutes an important factor of desertification with its variable nature of rainfall from year to year. There is an evidence of cyclical pattern of climate in Nigeria with alternating years of paucity of rainfall when the natural vegetation suffers a great moisture stress than usual. Records indicate that droughts had occurred frequently in the past in different parts of Nigeria with some of those especially in the 19th century resulting in famines. From the beginning of this century rainfall data indicate great fluctuations in rainfall received in the different parts of Nigeria with many years receiving amount below average. According to Ayoade (1988), progressive decline in rainfall became noticeable from about 1968 culminating in the 1972/73 Sahelian drought which had a devastating effect in the Sahelian countries. The drought affected mostly the extreme northern parts of Nigeria and resulted in wide-spread crop failures and death of thousands of livestock and herds (Table 3).

Table 3. Estimates of Livestock Population and Mortality during 1972/73 Drought In Sokoto. Argungu and Gwandu Division

Livestock	Population	Mortality	Mortality & Population
Cattle	1,510,815	302,163	20
Sheeps and Goats	4,378,050	874,999	20
Horses and Donkeys	867,865	163,300	19

Source: Ayoade (1988:275)

The drought also led to a drastic lowering of the water table, considerable drop in the levels of major rivers like Niger and Benue, contraction of Lake Chad and

large scale migration of people from the north and rural areas of the south and urban centres respectively. At the end of the 1982 harvest season, the New Nigeria Newspaper reported that about five million metric tonnes of grain valued at N4.2 billion would have been lost to the drought of that year. In 1988, the Punch Newspaper report that several villages were buried by sand dunes in Borno State.

SOIL EROSION

Soil erosion is a disastrous form of environmental degradation. It is disastrous not only in the havoc it is capable of wreaking but also in the fact that it can go on unnoticed until it is too late for its effects to be reversed.

There are many types of soil erosion in Nigeria. The gully types are the more obvious because of their remarkable effect on the landscape. According to a study (Ofomata, 1981), 70% of South-eastern Nigeria is affected by one form of erosion or another (Table 4). Abia, Anambra, Enugu and Imo States are the worst affected and gullies had reportedly washed away many farmlands totalling over 25,000 ha, homes and had even caused few deaths. An active gully had had been recorded as creeping, deepening, and widening at about 200 metres, 3 metres and 4 metres respectively per annum and the value of land, infrastructure and fixed capital assets which would be lost in the next 30 years at the current rate of erosion was estimated at N530 million by Niger-Techno. Ltd in 1975 (Aladejana and Adesiyan, 1982). Spectacular gullies are found in different parts of these four States particularly at places such as Agulu-Nanka, Obioma, Alo, Nnobi, Nnewi, Orlu, Ozuitem, Abiriba, Ohafia, and Uruala.

Table 4: Types of Soil Erosion in Southeastern Nigeria

Types of Erosion	Area (sq. km)	Percentage of total area of Southeastern Nigeria.
(a) Pluvial and Sheet Erosion		
1) Slight Sheet Erosion	23,568	29.98
2) Moderate Sheet Erosion	19,339	24.60
3) Severe Sheet Erosion	34,432	43.80
(b) Gully Erosion		
4) Incipient	786	1.00
5) Active	448	0.57
6) Inactive	39	0.05
<u>TOTAL</u>	<u>78,612</u>	<u>100.00%</u>

Source: Ofomata (1981): 95)

However, Sheet erosion is much more detrimental to agriculture than gully erosion as it goes on imperceptibly due to its constant and uniform action and may finally results in a complete removal of the arable parts of the soil. This is the most widespread type of erosion in the country and every part is affected by one form or the other. Erosion in Borno, Kaduna, Katsina, Kano and Sokoto is a result of the combined effect of wind and water action while the other parts are affected by erosion due mainly to the action of water.

Wind erosion occurs more generally in the extreme northern parts of the country while it is limited in both time and space in other parts. Some of the materials removed by the wind reach the southern parts of the country by dust-laden winds (north Easterly Trades) especially during the period of harmattan.

There is also substantial evidence of land degradation by mining and quarrying activities in various parts of Nigeria. Tin Mining in Jos Plateau with its open cast mining operations which started in early 1900 has caused the existence of large earth mounds, dried out ponds, puddles and open reservoirs rendering large areas virtually useless for agriculture. Mining of limestone in Nkalagu (Anambra State) and Odukpani (Cross Rivers State) as well as dredging/quarrying of sand and gravels along river banks, particularly in the southern parts of Nigeria deprive the soil surface of its vegetation and contribute to sliding, slumping and gully development resulting in land degradation.

Nigeria's annual mean soil loss through erosion is estimated to be 25 million tonnes. In Jos Plateau area alone, it is estimated that about 100 million tonnes of soil must have been lost within a period of 10 years. General decrease in soil fertility and diminution of cultivable land have also been noticed as a result of sheet erosion and the occurrence and expansion of gullies. According to a World Bank and I.M.F. report, soil erosion in parts of Nigeria has reduced maize yields from 6.5 tons a hectare to 1 ton (World Bank, 1987).

DEFORESTATION

Deforestation is a very serious problem in Nigeria. Although the issue of deforestation in the tropics has assumed large political significance on the international level due to the role of the tropical rain forest as a natural sink for greenhouse gases (particularly carbon dioxide), to the average rural dweller the problem of deforestation relates more to the scarcity of firewood for cooking.

Although the extent of deforestation in Nigeria is unknown due to lack of data, fragmentary information from many sources paints a rather grim picture. According to the World Resources 1990-1991 Report, the rate of deforestation

in Nigeria in the 1980s were estimated to be 400,000 hectares annually while reforestation was merely of the order of 32,000 hectares. This translates to the rate of forest loss of 2.7% annually. If that trend continues, it means that all our forest would be gone before the middle of the next century. At present, the country is estimated to have only 30% forest cover (about 277,132 sq.km). According to Nwoboshi (1986), there were 60 million hectares of forest and woodland in 1897 which had been reduced to about 9.6 million hectares by 1986.

One of the factors responsible for the high rate of deforestation is the uncontrolled cutting of wood for firewood and charcoal. Shortages of firewood which were very critical in most northern states particularly Kano, Jigawa, Katsina, Kaduna, Sokoto, Kebbi, Bauchi and Borno have now become national. In the north where 75% of the total cooking fuel is derived from plants, annual deficit of fire wood is put at about 5-8 million cubic metres. Another factor is the indiscriminate bush burning by farmers and others. For example, in 1982/83 dry season over 1700 hectares of forest plantations were burnt in the country.

There is so much pressure on the forest, due to rising demand for fuelwood, pulpwood, poles, and other types of wood for building purposes. The Federal Government estimated that the annual harvest of sown timber from the high forest was 1.5 million cubic metres in 1975 and at that rate would take between 25 to 30 years to denude the forests of mature timber (Aina and Salau, 1992:36).

Pressure of increasing human population and changing socio-economic circumstances are aggravating the problem of deforestation. Gazetted forest reserves are being reduced and converted to other uses. For example, in

Bendel State, over forty thousand hectares of government forests reserves were de-reserved by 1988 (Table 5).

Table 5: Forest Dereservation in Southern Nigeria

Forest Reserve and State	Gazetted Area (ha)	Dereserved Land (ha)	Alternative Land use
Anambra State:			
Osomari	12,098	1,500	Food crop farming
Akpaka	450	100	Food crop farming
Anambra	14,575	500	Food crop farming By enclave dwellers
Bendel State:			
Okomu	123,802	15,000	Federal oil palm Project
Orie River	40,633	(a) 60 (b) 19,166	Petroleum pipelines Food crop farming
Iguobazuwa	26,936	1,810	Cocoa Board Project
Ologholo-Emu			
Urho	14,996	145	Cattle Ranch
Ivi-Ada-Obi	18,002	580	Cattle Ranch
Ogba	5,517	(a) 720 (b) 1,010	Urban development: Airport: Federal Sawmill: forest Research plot. Food crop farming
Obaretin	10,800	2,849	Bendel oil palm Project
Ehor	29,583	8	Cocoa project
Ologbo	19,425	1,280	Oil palm plantation Project
Ebue	9,176	140	Food crop farming
Sakpoba	49,210	35	Oil exploration
Gilli-Gilli	36,260	26	Oil exploration
Akwa-Ibom and Cross River State:			
Stubbs Creek	31,080	11	Food crop farming
Ekinta	10,878	10,878	Food crop farming
Imo State			
Ubibia	755	106	Food crop farming
Achara-Ihe	794	300	Oil palm project
Rivers State:			
Upper Imo River	9,696	10	Food crop farming

Source: G. J. Osemeobo. (1988)

Nigeria's forests are of very important socio-economic and ecological significance. The forests have traditionally provided three important economic benefits: timber exports, traditional hunting and non-wood product gathering and fuelwood. Timber products still make an important contribution to GDP, representing about 7% of the agricultural product for the country but exports have declined drastically while domestic demand has risen considerably (World Bank, 1990).

A major effect of deforestation is the depletion of wildlife and loss of biodiversity. Biodiversity refers to the variety of all species of plants, animals, and microorganisms, their genetic make-up, habitats and ecological processes. Saving biodiversity is very important to us all as the utility of the various species is increasing and the fact that it is crucial to the intricate connections that nature has established. It is estimated that in Nigeria there are more than 4600 plants species of which about 205 are endemic (that is they cannot be found elsewhere.) Of these, about 484 plants in 112 families are threatened with extinction. Many animals and birds are also threatened with extinction.

According to one estimate, 25 out of 274 mammals, 10 out of 831, and 2 out of 114 reptiles known to exist in Nigeria are endangered (WRI, 1992:304). More alarming is the increasing disappearance of indigenous varieties of food plants and which are being replaced by foreign varieties. Seeking to increase their crop yields, many farmers had abandoned the traditional cultivars in favour of the new high-yielding and sometimes better tasting varieties. The result is the loss of indigenous species and uniformity replacing diversity. Previously plant diversity had helped to protect the farmer's crops from loss or damage especially at a time when a disease or pest struck one variety of crop, there

usually would be another variety immuned or partially immuned from this and thus limiting damage and preventing hunger or famine. With the new varieties, when a disease strikes, an entire crop may be destroyed. The Executive Secretary of the National Resources Conservation Council, Alhaji Saba, provided a list of these disappeared indigenous varieties (The Guardian, Sunday June 21, 1982). Examples of these local varieties are Anpkak (*Vigniasp*), Ambirigang (*Mucuna Sp.*) in the beans family which have disappeared where they are grown in Zango-Kataf Local government of Kaduna State and Nsama (*Stenostylis Stenocarpus*) a palatable black pole beans grown in Akwa Ibom and Cross River States. In the yam family, the red yam (*Anabvu*) grown by the Kajje people of Kaduna State as well as *Dioscorea dumetorum* and aerial yam are no longer cultivated. The "Snake tomato" (*Trichosanthis sp.*) a climbing close relative to the pumpkins, which ripe fruit was used a tomato has been replaced by the commercial tomato (*Lycpericon esculentum*). The "hungry" rice (*digilaria exils*), called Acha which is a rice-like grain eaten in hungry gaps between harvests in Pankshin and Southern area of Kaduna State is lost while Takurigan (the round groundnut) is no longer found in Kaduna and Katsina States.

Deforestation has also been associated with aggravating other ecological problems such as soil erosion, desertification and flooding. Forests constitute a major factor in carbon exchange with the atmosphere and, after the oceans, are the biggest sink in which atmospheric carbon may be stored. Thus the importance of conserving our forests cannot be overemphasized.

LAND AND WATER POLLUTION

Land and water pollution exist in all parts of Nigeria though to a varying degree. In view of the incipient stage of industrialization in Nigeria, pollution of land and water by industries is still a minor and spatially restricted problem.

Pollution from industrial effluents and urban sewage disposal have been of significance especially in the major industrial centres like Lagos, Kano, Kaduna, Aba and Port Harcourt. Hardly any of the cities has a central sewage and effluents disposal. Most residents in the low income areas depend on pit or bucket latrines. The materials from the pit latrines seep into the ground water without obstruction and may pollute nearby sources of drinking water especially wells. The waste materials from the bucket latrines are usually disposed raw into nearby streams or rivers. In the middle and upper areas, most houses are provided with septic tanks.

Almost all the industries discharge their effluent without prior treatment into rivers, lagoons, streams, or the sea. This is due to the fact that there is no effluent discharge guideline in the country until recently. Many industrial effluents are toxic as they include DDT, mercury, dyes, cadmium, etc. Some of the dyes used in the textile factories are believed to be carcinogenic. One of the major factors of land and water pollution in Nigeria is the oil exploration and exploitation. This is a very serious problem but it is restricted more to the areas of operation of the oil companies. The Niger Delta particularly has experienced the worst environmental impacts from the oil industry. Some of the effects of the oil industry on the environment include (Osuno, 1982): (a) destruction of vegetation and farmlands during exploration and for siting of locations as well as laying of pipelines. (b) the continuous presence of light, heat, noise and in some cases sooty emission from flares (c) oil pollution of the environment through accidental blowouts, leakages of oil pipeline and storage tanks and effluents from production and refinery operations. There have been many incidents of oil spillage in the eastern portion of the Niger Delta. These spillages and blowouts had occurred both on shore and off-shore (Table 6). The causes of the spillages are numerous with the most important being due to: (a) break-up of, or damage to oil tank or storage vessel, (b) damage to leakage or

leakage of oil pipeline (c) overflow of oil storage tank. (d) rupture or failure of loading, floating or underbuoy hose and (e) human interference, carelessness, or sabotage of oil pipelines.

(Table 6) Occurrence and Intensity of Oil Spillages in Nigeria, 1970-1980

Location	Date	Barrels Spilled	Barrels recovered
Bomu II	16/7/70	Not available	Not available
Obagi 21	1972	-	-
Qua Iboe Terminal	30/3/72	20,000	-
Obrikom	1977	N.A	-
TNP near Idu Ekanya	3/7/78	2,000	-
Etelebu Flow Station	16/9/78	2,000	1,000
SMB-1 Bonny Offshore	20/10/78	66,658	Nil
Isimiri Flow Station	22/11/78	700	200
Opobo Manifold	27/12/78	6,000	Nil
TNP near Rumuekpe	16/3/79	60,000	30,000
Okan	14/4/79	900	Nil
Bomu Flow Station	5/5/79	7,000	N.A
SMB-2 Bonny Offshore	6/6/79	1,973	Nil
TNP at Ihuowo	12/6/79	600	-
SBM-2 Bonny Offshore	20/6/79	706	-
SBM-2 Bonny Offshore	24/6/79	7,820	-
Forcados Terminal	6/7/79	570,060	20,000
Apoi North 20 (Offshore)	17/1/80	280,000	N.A

Source: Adapted from Ikporukpo (1983)

Offshore spillages such as those of Bonny and Apoi North 20 affected a much wider area than those occurring inland. Whereas spillages at Obagi and Isimiri affected only one village each, the Apoi North blowout affected about 200 villages and towns with a combined pollution of about 250,000 (Ikporukpo, 1983).

Oil spillages are not only environmentally disastrous but also often cause considerable socio-economic damages in the affected areas. For example, Funiwa V oilwell blowout which released over 400,000 barrels of crude oil into the marine environments resulted in the pollution of both water and land. According to Osuno (1982) within six months after the spillage, mangrove vegetation started dying, and in the contaminated waters, crabs, molluscs, and periwinkles died. The damage from this incident also resulted in a compensation of over N12 million being paid to affected individuals or groups.

Oil spillages have caused tremendous damage to fishing and farming which are the primary occupations of the inhabitants of the Niger Delta. The resulting pollution often affects rivers, creeks, ponds and wells from which people obtain water for drinking and other purposes. Describing the effect of the Apoi North 20 spillage, **West Africa** termed the situation, “a tragedy not so much of death though several people have died after drinking polluted water and a number of children are desperately ill – as of the total disruption of life”, (West Africa, 10/3/80 cited by Ikporukpo, 1983).

These are the realities of life in the oil producing areas. There is thus the need for understanding the increasing frustration of some of our communities who have to live with these negative externalities and who have obtained comparatively very little benefits from decades of oil exploration and exploitation. So we have to put Ogoni people and the Ogbia communities' demands for reparation within this context and thus be treated with sympathy.

AIR POLLUTION

There has been little concern for monitoring the quality of the air in Nigeria because of the belief that this is still a very minor problem. As the scale and tempo of industrialization increase, the direct health effects of gaseous particulates are becoming more obvious. However, there are many other sources of air pollution in the country and among these are (a) the flaring of natural gas (b) exhaust emission from automobiles and (c) noxious gases (oxides of nitrogen, sulphur dioxide, carbon dioxide, carbon monoxide, etc) from furnace and industrial machinery and from refinery wastes.

Air pollution is fairly intensive at the oil and gas production stage. Atmospheric contaminants from refinery are affected with the flaring of gas as is happening in most Nigerian oil fields. It was estimated that by 1986, the country was flaring 16.8 billion M³ of natural gas per year resulting in annual emissions of 2.7×10^6 kg of particular matter, 1.6×10^5 kg of NO_x oxides with attendant environmental consequences. Perhaps more important is the finding in a study of the impact of gas flaring on the environment which revealed that there was about 100% loss in yield in all crops cultivated about 200 metres away from the Izombe station, 45% loss for those about 600 metres away and about 10% loss in yield in all crops cultivated about 200 metres away from the Izombe station, 45% loss for those about 600 metres away and about 10% loss in yield for crops about one kilometre away from the flare (Okezie and Okeke, 1987).

Bush burning which is very rampant in Nigeria is another veritable source of air pollution. It is estimated that about 260,000 hectares per year of forest and 10,000 hectares per year of Savanna are burned annually (Osemebo, 1988). About 5.84×10^8 kg of particulate is emitted annually into the atmosphere by bush burning.

SOLID WASTE DISPOSAL

Heaps of refuse and garbage have become common sights in most Nigerian urban centres. According to a Federal Government publication, the problem of solid waste disposal “has today become the number one serious environmental problem facing the country with its consequent effects on the pollution of water, air and land, not to mention its hazards to health and other natural resources of social and economic importance” (Nigeria N.d.: VII). The rapid rate of population growth has led to a phenomenal increase in the volume and complexity of solid wastes being generated daily in the country within the past two decades.

As estimated 20kg of solid wastes is generated per capita per annum in Nigeria, equivalent to 1.8 million tonnes (assuming an estimated population of 90 million). The increasing volumes of solid wastes have overwhelmed urban administrators’ capacity to plan for their collection and disposal in most cities. As can be seen in Table 7, the volumes of solid wastes are projected to increase tremendously by the end of this century in all Nigerian cities.

Different types of solid wastes are generated in Nigerian cities and the fact that the nature of the wastes generated in the cities is completely different from those generated in the rural areas constitutes part of the problem of disposal. Whereas most of the solid wastes generated in the rural areas consist of mainly food remnants, leaves and other biodegradable materials, those in the cities are not only non-biodegradable but are sometimes toxic and flammable.

Table 7: Estimated and Projected Volume of Solid Waste Generation in Some Nigerian Cities

	1982	1985	1990	2000
	Tonnes Per Year			
Lagos	625,394	681,394	786,079	998,081
Ibadan	350,823	382,224	440,956	559,882
Kano	319,935	348,580	402,133	535,186
Kaduna	257,827	280,925	324,084	431,314
Onitsha	42,240	263,929	304,477	386,593
Port Harcourt	210,934	229,821	265,129	352,853
Oshogbo	131,903	143,712	173,720	253,841
Aba	131,903	143,712	169,719	236,703
Jos	99,871	111,905	135,272	197,600
Warri	67,477	75,607	91,395	133,531
Gusau	44,488	48,471	57,243	79,835
Potiskum	15,434	16,816	19,399	28,347
Uyo	12,508	13,628	15,721	20,923
Suleja	9,383	10,514	13,311	21,336
New Bussa	4,690	6,200	7,152	9,518

Source: Federal Ministry of Housing and Environment (n.d.):
The State of the Environment in Nigeria, Monograph
Series No. 2, Lagos.

The ineffective solid waste disposal system has often resulted in wastes being indiscriminately dumped on open plots and even streets and roads, converting them into unsightly junk yards, unsuitable for almost any use and promoting destructive flooding happened in the case of Ogunpa River in Ibadan. As we all know it was in the efforts to improve environmental sanitation in the country that the Federal Military Government promulgated the Environmental Sanitation Edicts in 1984. Under the edict, a war was declared on filth as part of the general War Against Indiscipline (**WAI**) campaign. The last Saturday of every month was declared environmental sanitation day when everybody must

stay home in the morning hours to keep their homes and surroundings clean. Although the campaign was a laudable one in trying to inculcate the habit of environmental sanitation in people, the capacity of the government to evacuate and dispose the accumulated garbage did not improve and thus the situation arose in which the wastes remain for days if not weeks, uncollected. Stop.

FACTORS RESPONSIBLE FOR ECOLOGICAL CRISIS

Mr. Vice Chancellor, Sir, we have spent the last few minutes examining in some details the nature of some aspects of ecological problems in our country. Of course, we could not lay claim to have exhaustively dealt with these nor to claim that we have presented anything that is strange to this distinguished gathering. We would proceed next to examine some of the factors responsible for these problems.

The factors responsible for the current ecological problems in Nigeria as in most developing nations are many, complex and interrelated. However, the genesis of the problems and the reason for their aggravation cannot be fully comprehended unless our analysis is placed within a broader and historical context.

An analysis of the environmental heritage which encompasses attitudes, structures, and behavioural patterns in relation to the natural environment is a starting point at uncovering the reason for the current problems. The transformation from the pre-colonial period to the present has been identified as a major factor (Aina and Salau, 1992: 94-101). During the pre-colonial period, the level of environmental awareness of the people of Nigeria was much higher.

As the people relied more directly on the nature for their sustenance, the relationships with the environment was in the direction of conservation,

respect, good husbandry and efficient use of natural resources. The clearest evidence of this was to be found in traditional land use and human settlement patterns, in folklores and rituals, and in various technologies that rely on environmental resources. In most communities, land was regarded as sacred with each generation holding it in trust for the succeeding generations. Although each has the right to beneficial usage, no member of the family has the right to alienate any portion of it to others. Folkloric taboos and rituals were also used as tools of conservation. The regulation of hunting, fishing and fuelwood collection, and the linking of these activities to festivals or some cultural rites were other devices for conservation of natural resources. Individual and collective behaviours towards the environment were regulated by the community. The cleaning of individual homes and their surroundings were the responsibility of the household while communal grounds were maintained collectively. Because of their close interaction with their surroundings, the people had an intimate knowledge of the natural environment and thus were able to devise simple but effective technologies distilled over centuries.

Traditional management techniques were also utilized to safeguard the natural resources. Examples of such management techniques to improve the land for cultivation such as rotational system, legume seeding, intercropping, ridging and heaping, agro forestry, and alley farming once spurned or labelled as 'primitive' are now well appreciated. Indeed, this seems to confirm the prediction of a famous British Geographer, Dudley Stamp (1938) that science has much to learn from.

“The native farmer (who) has already evolved a scheme of farming which cannot be bettered in principle even if it can be improved in detail and that as practised in some areas, this scheme

affords almost complete protection against soil erosion and loss of fertility. It may be that the African has thus a contribution to make towards the solution of the great soil erosion problems of other regions”.

Colonialism effected a major change in environmental awareness and existing relationship of the people with the environment. A notion of development whose major thrust was the exploitation and resources, primarily for the benefit of the colonial rulers was introduced.

There was a mental shift in the perception of natural environment from being a factor to work with to secure sustenance to being a factor that had to be overcome, subdued or transformed to promote human welfare. Further, the introduction of a monetized economy weakened the effectiveness of communal approaches to using environmental resources, while new imported religious ideas undermined traditional beliefs and the bases for many protective practices towards the environment. Colonization in particular affected land use. Land became just another commodity with the result that previous measures and practices which are environmentally compatible became less important. Land was turned into open access resources with no management or control over use by individuals.

Within the exploitative logic of the colonial enterprise, it was not surprising that the British colonial regime in Nigeria placed the environment on a very low level in its priorities vis a vis economic exploitation and political pacification. It was equally not surprising that the colonial state, in its bid to maximize its extraction from the colony for export to the British metropole, emphasised a state-centric planning strategy. Unfortunately the post-colonial period has seen

the continuation of the strategy and ethos of development of the colonial administrators.

The development styles adopted by the governments were based on the quest for faster rate of economic growth and industrialization in particular. In the process little attention was paid to some section of the population which became increasingly marginalized.

The style of development and the accompanying sectoral policies have also undermined food production and environmental management. The rural areas lost the initiatives and became less and less important in the scheme of things.

More of the lands in the rural areas are being converted to urban and industrial uses or to cash crop monoculture. Energy and water go to rich urban users or expensive irrigation projects. Development policies have also promoted demographic imbalance, rural exodus, exponential urban growth, and increasing population which is putting so much pressure on the natural resources base.

The adopted style of development has also placed undue emphasis on technology. Technology engendered the feeling that man could totally dominate his environment at no cost. The result is that technological solutions are often applied to problems which are more social or economic in nature or origin. For example, big dams are built for; among other reasons, providing water for irrigation but these have often drawn attention away from the real problems of poor land management and archaic land tenure system. In another sense, the transfer of technology to developing nations has been found to have negative effects on their social and natural environment (Farvar and Milton, 1972). Widespread adoption of mechanized farming and the application of new inputs like inorganic fertilisers, pesticides and herbicides have precipitated in

the long run other environmental problems. The ideology of man over nature bred by technology has also discouraged the traditional methods of coping with the environment. Ecologically sound traditional practices were thus spurned in favour of ill adapted western technologies.

Poverty has been recognized as one of the worst culprits in effecting ecological degradation. The World Commission on Environment (1987:28) aptly summarizes this view as follows:

“Poverty itself pollutes the environment, creating environmental stress in a different way. Those who are poor and hungry will often destroy their immediate environment in order to survive: they will cut down forests; their livestock will overgraze grasslands they will overuse marginal land, and in growing numbers they will crowd into congested cities. The cumulative effect of these changes is so far reaching as to make poverty itself a major global scourge”.

The statement is not meant to ascribe all blames for environmental degradation to the poor. The poor are often victims of the wild scramble to exploit the common resources like rivers and forests. They are driven often in desperation to over-exploit these common resources as there are no viable alternatives. Perhaps more important is the fact that the poor bear more the brunt of environmental degradation than well off because they lack the economic political and technological power to deal with the problems. For example, they are hurt most by flooding as they live or cultivate the floodprone areas and water pollution affects them more because they cannot afford to pay for better services. Wide disparities in income and consumption are thus antithetical to natural resource conservation. Natural resource conservation

and sustainable development call for a more equitable distribution of the benefits of development and a broad based participation in decision making process. Rather than being the culprit the poor constitutes part of the solution to environmental degradation.

Population dynamics is now regarded as important factor in environmental degradation. Although there is no simple correlation between population growth and the state of the environment, there is no doubt that the exploding rate of population growth puts tremendous strain on the natural resources.

The population factor cannot be ignored especially in the case of a country like Nigeria with a relatively large and rapidly growing population. With respect to the size, although the country's total population is now estimated at about 90 million, the rate of growth is one of the highest in the world.

Three important aspects of the demographic variables in this respect are the rate of urbanization. The rate of urbanization is now estimated to be over 5% per annum. The urban segment of the population currently estimated at 30% is expected to increase to about 50% by the year 2000. The rate of population growth and urbanization has continued to outstrip the rate of economic growth. A unique feature of the demographic structure in Nigeria as in most developing nations is the high proportion of young age group (under 15 years and who have to depend on the shrinking working age group. The pattern of population distribution is another source of concern. While there is underpopulation in few areas, there is an acute overpopulation in other areas. Population pressure has also been identified as an important factor in desertification.

The northern semi-arid areas are believed to be overstocked with animals. The pressure on land use due to increased population in the length of fallow period has led to impoverishment and loss of top soil.

TOWARDS SUSTAINABLE DEVELOPMENT IN NIGERIA

Mr. Vice-Chancellor, Sir, we cannot conclude this lecture without proffering some suggestions which can help in solving the problems we had examined above.

The institutional framework for coping with ecological problems as well as the associated policies and programmes must be strengthened. In this respect, the Babangida Administration must be praised for establishing the Federal Environmental Protection Agency (FEPA) and the National Resources Conservation Council (NRCC) and for the formulation and adoption of a national policy on the environment in 1989. The creation of these bodies was long overdue. The potential areas of dispute between these two bodies have been recognized (World Bank, 1990) as the division between “environmental issues” and “conservation issues” is artificial and not tenable in practice. There is thus the need to consolidate these two bodies into one entity. Such an entity must be independent and not be placed under any ministry because as Mabogunje (1988:22) puts it, “an organization which must serve as a debt – collector.... cannot be one or part of the agencies creating or generating the debt”.

Nigeria. Like most developing nations, has only fragmentary information on different aspects of her natural resource base. There still exist extensive gaps in our knowledge of the quantity, potential, and ways to manage our natural resources in a sustained fashion. Thus inventory of natural resources and their management, must be carried out periodically. In this light the government should make funds available to FEPA and NRCC to procure new available

technologies and upgrade their personnel so as to create a national environmental information system.

It is now realized that a major cause of natural resource degradation can be ascribed to the failure of the market to reflect the full value of natural resources. The result is that many natural resources and environmental services are “underpriced” leading to their being overused and degraded. Thus proper pricing of natural resources to reflect their relative scarcities must be an essential element for natural resource conservation (Salau, 1991).

Nigeria should institute a form of “green taxes” now in use in some advanced countries. These “green taxes” include levies or charges on air and water pollution, waste, noise and potentially harmful products. They are based on “polluters Pay Principle” and are designed to make polluters pay for the costs of clean-up or damage done by the production or consumption of goods under consideration. Some of the proceeds from these taxes can be used to set up a “Green Bank” or Natural Resources Development and Conservation Bank which can provide loans to entrepreneurs for installing pollution abatement equipment or funds to the inhabitants of areas affected by ecological disasters.

Furthermore, it is now recognized that the system of national account which relies on conventional economic growth measures like the Gross National Product (GNP) is quite deficient as it does not incorporate depletion and degradation of natural resources and thus fail to project a realistic evaluation of economic development prospects. Nigeria needs to adopt a natural resource accounting system that takes ecological degradation into account. This will be a “balance sheet” which gives the profile of the stock resources available at a particular point in time, what uses are made of this stock of resources available at a particular point in time, and what sources they are derived from and how they are added to or transformed over time (Pearce, et al, 1989:93).

Natural resources represent the collective assets of a nation and all citizens must share in the proprietary rights over the environment in order to care for its conservation and sustenance. In this light the necessity for structures and institutions reflecting broad public interest becomes imperative. For effective environmental management, Nigerian Federation must be operated in a less centralizing and more participatory manner. Environment is a common property and individuals and groups must be given opportunity to sue the state if some aspects of the environment are being jeopardized. It was the belief that the resolution of environmental problems must not and cannot be left in the hands of the government that motivated us to form environmental pressure groups called **NEST** (Nigerian Environmental Study/African Team). Environmental problems could only be solved if more people at the grassroots are educated and encouraged not to surrender the responsibility of nurturing and conserving their environment to the government.

Mr. Vice-Chancellor, sir, distinguished Ladies and Gentlemen; in conclusion, I will like to end this lecture by stressing that environmental degradation constitutes a threat to the process of development.

For a country like Nigeria, the maintenance of even the existing standard of living may be jeopardized unless urgent steps are taken to cope with environmental degradation. Present efforts must be sustained and indeed increased at maintaining the natural resources base upon which Nigeria depend for continued economic development. There is a need for an intensive, sustained public education on the environment and a way must be found perhaps through economic incentives or penalties for inducing environmentally sound practices by individuals and groups.

I thank you very much for your attention and patience.

REFERENCES

- Salau, A.T(eds.) (1992) The Challenge of Sustainable development in Nigeria Ibadan, NEST pp. 248.
- Ayoade J.O. (1988) **“On Drought and Desertification in Nigeria”** (in Sada, P.O. and F O. O. Odemerho (eds) **Environmental Management in Nigeria Development** Ibadan, Evans Brothers pp271 - 290
- Bartelmus P. (1986) **Environment and Development**, London, Allen & Unwin.
- Farvar, M.T. and J.R Milton (eds) 1972: **The Careless Technology**, Garden City, N.Y. Natural History Press.
- Hagget. P. (1992) **Geography: A Modern Synthesis**, N.Y. Harper & Row.
- Ikporukpo, C. (1983) **“Petroleum Exploitation and Socio-economic Environment in Nigeria” International Journal of Environment Studies**, Vol. 2. 193-203.
- Mabogunje, A.L. (1988) **“The Date to Posterity: Reflections on national environmental programmes”** in Sada. O.O & Odemerho. F.O. (eds.) **Environmental Issues and Management in Nigerian development**, Ibadan, Evans Bros.
- Manners, I.R. & Mikesell M.M. (eds.) 1974: **Perspective on Environment**, Association of American Geographers, Commission on College Geography, Publication No. 13.
- Mortimore, M. (1985) **“Shifting Sands and Human Sorrow: Social Response to Drought and Desertification”** Society of Fellows, Durham University Research Foundation.

- NEST (1991) **Nigeria's Threatened Environment: A National Profile**, Ibadan, NEST, pp. 288.
- Nigeria (n.d.) **The State of the Environment in Nigeria**, Lagos, Federal Ministry of Housing and Environment, Monograph Series No. 2.
- Nwoboshi, L. C. (1986) **"Meeting Challenges of the Deforestation of Nigeria Through Effective Reforestation"** in Oguntala, A. (ed.). *The Challenge of Deforestation in Nigeria. Proceedings of the 16th Annual Conference of the Forestry Association of Nigeria*, pp 225-239.
- Ofomata, G.E.K (1981) **"The Land Resources of Southeastern Nigeria: A Need for Conservation"** (in Igbozurike, UM (ed.) *Land Use and Conservation in Nigeria*, Nsukka, University of Nigeria Press, pp 94-108.
- Okezie, D.W. and Okeke, A.O. (1987) **"Flaring of Associated Gas in Oil Industry: Impact of Growth, Productivity and Yield of Selected Farms Crops Izombe Flow Station Experience"** (Presented at the NNPC Workshop, Port Harcourt).
- Osemebo, G. J. (1988) **"The Human Causes of Forest Depletion in Nigeria"** *Environmental Conservation* 15 17-28.
- Osuno, B. A. (1982) **"Impact of Oil Industry on the Environment"** (Proceedings on Environmental Awareness Seminar for National Policy-makers, Lagos, pp 51- 58.
- Peace, D. W. Markandya, W.A. & Barbier, E. (1989) *Blueprint for a green Economy*, London, Earthscan.
- Rodney. W. (1982) **How Europe underdeveloped Africa**, Enugu, Ikenga Publishers.
- Salau, A. T. (1991) **"Ecology and Economics: Economic strategies For natural resources Conservation in Nigeria"** (A Keynote address presented at the National Workshop on mobilizing finance for natural resource conservation in Nigeria, organized by NACCR, Zaria, 7 – 9 May).
- (1992) **Global Environmental Change: A Research Agenda for Africa**, working paper 2/1992, CODESRIA, Dakar.

Salau, O. A. (1993 a) "The Global Environmental Crisis and its Challenge to regional integration in West Africa" (Paper presented at the West African Conference on Regional Integration organized By IDRC, Dakar, (Jan. 11 – 15).

Salau, A. T. (1993 b) "Environmental and Development in Africa: Reflections on the South Commission Report from a regional perspective" (Paper presented at the International Conference on the Report of the South Commission organized by CODESRIA, Abidjan, March 1 – 15).

Stamp. L. D. (1938) "Land Utilization and Soil erosion in Nigeria" **Geographical Review** 28: 32 – 45.

Shanmugaratnam, N. (1989) "Development and Environment" A View from the South" (**Race and Class**) Vol. 30 (3): 13 – 30).

World Bank (1990) Towards the development of an environmental action plan for Nigeria Washington DC. Report No. 9002 – UNI.

World Bank (1992) :World Development Report 1992 Washington DC.

WCED (1987): Our Common Future, Oxford University Press.

WORLD RESOURCES INSTITUTE (WRI) (1992) **WORLD RESOURCES 1992 – 93**, N. Y. Oxford University Press.