INTRODUCTION:

Human health, well-being and indeed survival are ultimately dependent on the health and integrity of the whole environment in which we live. Today the natural world that we share with all forms of life on this planet is under unprecedented attack not by outside forces of evil, as in a science fiction movie, but rather by a wide range of human activities and sheer pressure of human numbers (Engelman, 1997; Engelman, et al 2000). Sometimes unwittingly, sometimes with full awareness of the consequences of our actions, we are rapidly altering the basic foundations of the environment that sustains us. As a matter of fact, the issue of feeding additional multitudes in the years ahead looms as a monumental task for future leaders. Population growth exerts socio-economic and environmental impact on human well-being and on the sustainability of planetary life support systems (Engelman, 1997). Even in many parts of the world today evidence is mounting that large and still growing human and livestock populations have already exceeded the carrying capacity of the land itself (Coffin, 1993). In effect, when efforts are being made to produce more from a given land area to sustain increasing numbers of people the aftermath is damaging to the natural ecosystem to the extent that they are becoming incapable of supporting their present population. Condition in natural habitat and fragile ecosystems are deteriorating resulting in diminishing biological diversity (Engelman et al, 2000).

It appears, therefore, that renewable resource, in particular freshwater, forest, topsoil and marine fish stocks continue to be used at rates beyond their viable rates of regeneration. The purpose of this study is to discuss the challenges for environment and sustainable development and reveals the specific ways in which human population, consciously or not, are radically undermining the stability of natural environment.

CARRING CAPACITY

Carrying capacity is a measure of the number of individual of any species that a particular environment can support. In a simpler language, it refers to the number the earth can support. Ehrlich et al, (1989) define it as the number of people the earth can support without irreversibly reducing its capacity to support population in the future. This is a global-level definition because it also applies at the national level, although with

many qualifications as concerns international relationships of trade, investment, etc. It is a highly complex affair reflecting food and energy supplies, ecosystem services, human capital, people's lifestyles, cultural constraints, social institutions, political structures and above all, public policies, among many others. Logically, population growth must stop at some point, or the earth would become overcrowded. But what is this maximum human population?

There is evidence that human number with their consumption of resources already exceeds the carrying capacity. According to Brown et al (1990) the three principal and essential stocks of renewable resources are forest, grassland and fisheries, which being utilized faster than their rate of natural replenishment. The conclusion of recent studies range widely (Ehrlich and Ehrlich, 1990: Fearnside, 1986; Hanks, 1987; Kirchner et al, 1985). Some conclude that the world's current population of 5.4billion is more than the earth's carrying capacity because widespread damage to the environment and overuse of natural resources has already occurred (Ehrlich et al, 1989: Ehrlich and Ehrlich, 1990). Others assert that if everyone had the standard of living found in the developed nations today, the world could sustain only one or two billion people (Hullet, 1970: Weting, 1981; Crenson 1990). A computer model using data on food, resources, industrial output, population and pollution found that a world population of less than 8billion could be sustained at an adequate but not luxurious standard of living (Meadows et al. 1992). Differing results also reflect the different perspectives that researchers bring to making their estimates. Biologists focus on the viability of natural ecosystems. Economists focus on supply and demand and on pricing mechanisms. And the futurists assert that new, as yet unidentified technologies can arrive in time to provide for the growing population.

Three physical constraints pose an absolute limit on the world's population and these are:

- The finite capacity of natural systems to provide food and energy and to absorb waste;
- The amount of greenhouse gases that can accumulate in the atmosphere without triggering irreversible climatic changes; and
- The amount of the freshwater available to support humans, other animals and plants.

Nobody can know how many people the earth could support while few would want to find out the hard way, that is, by reaching this theoretical limit. Calculating the maximum number of people who could exist on earth seems less important than determining how resources can be used wisely and managed sustainably to improve living standards without eventually destroying the natural environment that supports life itself.

POPULATION GROWTH PROBLEMS

Growth in human numbers in conjunction with growth in human consumption and growth in environmentally adverse technology can build up a situation that eventually generates an "overshoot" outcome (Myers, 1994). According to Myers (1994) this outcome can precipitate a down turn in the capacity of environmental resources to sustain human communities at their former level, which amounts to a macro-level change. This is designated as a "jump effect" of environmental discontinuity or a threshold effect of irreversible injury. Myers (1994) stated that this occurs when the ecosystems had absorbed stresses over long periods without much outward sign of damage and then eventually reach a disruption level at which the cumulative consequences of stress appear in the critical proportions. One can well anticipate that as human communities continue to expand in numbers, they will exert increasing pressures on ecosystems and natural resources stocks, where-upon environmental discontinuities will surely become more common.

Some of the major problems of population growth in Nigeria include the following:

Due to increasing population and consequent demand for agricultural land and rural and urban demands for forest products both for domestic and industrial use, soil erosion is now more pronounced in many parts of the country. For instance, within 14 years (i.e. 1981-1994), the country lost 3.7 million hectares of forest and farmlands to erosion and soil degradation (Ayonote, 1999). About 3.25 million hectares were in Southeast- Anambra, Imo, Enugu, Akwa-Ibom, Abia and Delta state alone. The Nanka erosion gullies in Anambra state have been described, according to a United Nations Development Programme (UNDP) study as the most complex single erosion site in the

whole world. Given the facts that under normal agricultural conditions it takes from 200 to 1,000 years to form an inch of topsoil, such losses could well undermine the productive capacity of farmlands if effective conservation strategies are not implemented. The Food and Agriculture Organization of the United Nations has warned that unless Third World Countries give much higher priority to soil erosion control efforts, they would witness a 30% reduction in harvests by the end of the 21st century at which time their populations will have increased by as much as sixfold over current levels (FAO, 1999).

Land degradation is caused by a variety of human activities such as agriculture, mining, overgrazing and recurrent bushfires. Land degradation due to over-grazing is most pronounced in the North while extensive areas of rangeland in the forest region are severely affected as well (NEST, 1991). The many native species of fish and wildlife inhabiting these rangelands have been severely affected by deteriorating ecological condition. Land degradation due to mining is pronounced in the southwest, for example, Igun where extensive landscape has been destroyed and deprived of the native flora and fauna. With much land degradation deriving from excessive human pressures, the most productive way to reverse the situation surely lies with a reduction in population growth.

Population pressure has also resulted in the genetic loss of a vast array of valuable plant species. Osuntogun (2001) reported that an estimated 484 plant species are threatened with extinction's (see table 1). This confirms a study carried out by Gbile et al (1981) that about 480 plant species are seriously endangered while about 76% of these plant species are in the high forest zone. According to Osuntogun (2001), uncontrolled logging and tree felling from which government generates paltry taxes accentuated by lack of restocking are the order of the days in many parts of the Southern States of Nigeria, carrying with it loss of precious ecological diversity.

Habitat loss and increased pressure from hunters, poachers and bush burning has caused a serious decline in Nigeria's wildlife species (NEST, 1991; Orimoogunje, 1999:2000; Osuntogun, 2001). About 10-12 species of primate including white throated guenon species are under threat (see Table 2). Osuntogun (2001) further revealed that,

areas earmarked as greenbelts and for recreation are being systematically converted into building sites.

Loss of biological diversity due to deforestation, fuelwood harvesting, slash-and-burn agriculture, mining activities, bushfires and over-exploitation of marine resources (NEST, 1991; Adesina, 1997; Orimoogunje, 2000; Osuntogun, 2001). The magnitude of such a loss is staggering (Osuntogun, 2001). Species diversity is generally considered a prime determinant of ecological stability; extinction of key species, particularly plant species may lead to the collapse of whole ecosystems (Myers, 1988).

TABLE 1:PLANT SPECIES FOR URGENT ATTENTION OF CONSERVASTION IN NIGERIA

NO	NAMES	FAMILY	STATUS
1.	Crateranthus talbotti	Lecythidaceae	E,M*
2.	Didelota africana	Ceaselpiniaceae	E,M
3.	Loesenera taboltti	,,	E,M
4.	Cryptosepalum diphyllum	Ceaselpiniaceae	E
5.	Piptostigma pilosum	Annonaceae	E
6.	Okoubaka subrevillei	Octoknemataceae	M*
7.	Dichostemma glaucescens	Euphorbiaceae	M*
8.	Cyrogomone argentea	,,	M*
9.	Mareyopsis longifolia	,,	M*
10.	Acalypha manniana	,,	M*
11.	Pseudagrostistachys africana	,,	M*
12.	Plagiostyles africana	,,	M
13.	Ophiobostrys zenkeri	Flacourtiaceae	M
14.	Phyllobotryum soyauxianum	,,	M
15.	Araliopsis tabouensis	Rutaceae	M
16.	Scytopelalus tieghemii	Scytopelaceae	M
17.	Salvadora persica	Salvadoraceae	M
18.	Radlkofera calodendron	Sapindaceae	M

Source: Riodiversity strategy and Action Plan for Nigeria, Nov. 1997.
KEYS: E – Endemic species in Nigeria
M- Monospecific genera in Nigeria
*- Genus represented by only one species in the world flora.

The problems of industrial pollution and oil spills are enormous in Nigeria. These have led to the death of entire aquatic ecosystem in some parts of Nigeria (Okpalaeke, 2001). Okpalaeke (2001) reported that many primates especially the *scalatters aeurion* and the short *snoutail* crocodiles are now endangered. Numerous wildlife species have suffered sharp population declines, and contamination of rivers, lakes and estuaries with

industrial effluents threaten the sustained productivity of those ecosystems (Niboro, 1999; Okpalaeke, 2001; Osuntogun, 2001).

TABLE 2: ENDANGERED AND THREATENED ANIMALS OF CONSERVATION CONCERN.

REPTILES AND AMPHIBIAN		
Biodae		
Python regius	Royal Python	E
Python sebae	Rock Python	E
Veranidae		
Varanus niliticus	Nile monitor Lizard	E
Varanus examthmaaticus	Short tailed monitor lizard	E
Crocodylidae		
Crocodylus cataphractus	African slender-snouted crocodile	I
Crocodylus niloticus	Nile crocodile	V
Osetolaemus tetraspis	West Africa dwarf crocodile	I
Arthroleptidae		E
Cardioglossa schietzi		I
Cardioglossa melanogaster		I
Leptodactylon biocolor		I
Chelonidae		
Ertmochelys imbricata	Hawsbill turtle	
Lipidochelys olivacea	Olive Ridley turtle	
BIRDS		
Phasnea galeata	Helmeted guinea fowl	E
Francolinus bicalca	Bush fowl	E
Malimbus imadanensis	Ibadan malimbe	E
Estrilda paliopareia	Anambra waxbill	E
Struthiondae		
Struthio camelus	Ostrich	V
Pelecanidae		V
Ardeidae		V
Scopidae		V
Scopus umbretta	Hammerkop	V
Ciconiidae		V
Plataleinae		

Source: Riodiversity strategy and Action Plan for Nigeria, Nov. 1997.
IUCN Categories: Ex- Extinct; E- Endangered; V- Vulnerable; I-Indeterminate; R- Rare;
K- insufficiently known.

Desertification and drought brought about by population pressure, overgrazing and the continuous exploitation of marginal lands has caused a serious decline in Nigeria's flora and fauna. Investigation indicates that Nigeria is losing about 351,000km^2

of its landmass to the desert which is advancing southward at the rate of 0.6km/year (Osuntogun, 2001). In arid zones of the north desertification is by far the most pressing environmental problem, particularly along the Niger Republic border (NEST, 1991; Osuntogun, 2001).

Population pressure has resulted in shortage of agricultural land and employment opportunities in the rural areas where it has led to increase in urbn-rural migration. This problem of agricultural land shortages is becoming widespread in Nigeria, most especially in the forest region, where land provides the livelihood for an average of 60% of the populations and where the great bulk of the most fertile and accessible land has already been taken. Osuntogun (2001) reported that unsustainable exploitation and degradation of Nigeria's forests, soils, wildlife, freshwater and other natural resources threatens to undermine the country's development prospects by perpetuating poverty.

INTERRELATIONS OF POPULATION AND ENVIRONMENTAL PROBLEMS

The explosive population growth and the unfavourable spatial distribution in many parts of Nigeria have contributed to the degradation of the environment and the depletion of resources. The combined effect of human and animal pressure on land has accelerated the process of decreased water infiltration, increased surface runoff, the drying up of surface water resource and the loss of soil nutrients both in the Northern and Southern parts of the country. Due to economic poverty and weak technological base, a large number of low-income households are being forced to overuse and mis-use the resource base for survival, for example, the movements of the Ebiras, Igalla, etc, unto the forest region.

In major towns and cities such as Lagos, Ibadan, Kaduna, Aba, Onitsha, etc, - population growth is too rapid to permit adequate supply of social services, such as shelter and health-care, for the city-dwellers. Inadequate facilities have, in turn, led to pollution of land, water and air, which are the sources of various epidemic and chronic diseases.

Conversely, environmental degradation in Nigeria has brought about negative impact on its population. The destruction of forests, grasslands and fisheries and lack of

adequate shelter have increased tremendously the vulnerability of millions of people to natural disasters.

As a result of land degradation, deforestation and desertification, many plant and animal species have disappeared in Nigeria and others in danger of extinction. For instance, Bufallo is highly endangered in the forest zone of Nigeria. Acute shortages of fuelwood and water for human consumption have a cumulative effect and make it difficult, if not impossible, to replace the losses. Crop yields have declined as a result of soil erosion and nutrients depletion. The livestock carrying capacity of land has also declined due to decreasing vegetation.

POPULATION AND SUSTAINABLE DEVELOPMENT

Nigeria's growing population combined with unsustainable production and consumption patterns is putting increasing stress on forests, grassland, water, air, land and other essential resources. Human activities such as felling trees for firewood and clearing forest for agriculture have degraded the environment and depleted the natural resources. In order to tackle the population and environment problems in Nigeria, conservation and economic development should ideally be directed towards a common goal, that is, the rational use of the earth's resources to achieve the highest quality of living for mankind.

There is need for studies to be undertaken on the interrelations between population and environment. The results of this would be useful to policy makers in designing and implementing socio-economic development programme. These measures would contribute to achieving development goals for sustainable development since necessary institutions and manpower would be made available.

Family planning programmes play a key role in sustainable development. When family planning information and services are widely available and accessible couples are better able to achieve their fertility desires (Hinrichsen, 1990). Even in adverse circumstances family planning programs have meant slower population growth and improved welfare (Bongaarts, 1992).

A wide range of programs addressing environmental and population problems is urgently needed for a sustainable environment. These are tagged environmental actions

(Repetto, 1985; UNEP, 1989; Matthew, 1991; WRI, 1992; Osuntogun, 2001). These include;

- Preserving arable land, forests, water supplies, and coastal areas;
- Reducing pollution by curbing factory emissions and promoting better sanitation;
- Conserving energy;
- Introducing less polluting, more efficient technologies;
- Removing subsidies that distort market prices and encourage short term use at cost of future productivity;
- Using economics incentives to reduce pollution and resource depletion; and
- Assisting local areas vulnerable to damage.

The public and key professionals such as planners, economists and health workers should join hands in understanding the implications of current environmental and population trends and develop a consensus on appropriate actions. Government should forge partnership with business enterprises on the use of up-to-date technologies and recycling, treatment and proper disposal of wastes. This could greatly reduce industrial pollution, save money, and attract investors and foster positive community relations.

Lastly, all efforts should be made to improve the living and working conditions of the poor people living in urban slums and rural areas through eradication of poverty, inter alia, by implementing integrated rural and urban development programmes. For the Nigerian environment to be sustainable, every stakeholder should make every effort to lessen the effects of population on environment problems.

CONCLUSION:

In order to improve Nigeria's prospects of achieving environmentally sustainability and economic growth, major efforts must be made to bring into focus a new set of programmatic actions that are oriented to creating and/or strengthening national, state and local capacities in assessing the status of the country's environment, and formulating and implementing systematic policies and laws. Researchers should inform policy-makers of research finding, while more studies should be put in place to examine the impact of population trends on environment. A wide range of programs addressing environmental and population problems should be urgently embarked upon. People at the local level should be depending upon to preserve their environment and improve standards by involving them in project planning and implication.

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