
Technology Versus Environment: A Race between Development and Catastrophe. Which Will Win the Race?

By

Okon Akpakpan Udoh
*Directorate of Continuing Education,
Akwa Ibom State College of Education,
Afaha Nsit.*

Abstract

As the pace of technological progress accelerates world-wide, there is a rapid astronomical build-up in global environmental crisis as if a battle line were drawn between development and catastrophe; and as though the victor was being awaited in the coming years. The paper forecasts a clear win for catastrophe, if and only if control measures are not taken urgently in grey areas such as deforestation, land, water and air pollutions, including the reported incidence of memory loss and brain tumor arising from the frequent use of cell phones. The paper, therefore, recommends among other therapies, the simple precautionary measure of alternating ears every few minutes during a long phone call.

Generally, technology refers to those things people device to accomplish particular ends. It refers to the different categories of human productive effort and the processes people use to change various aspects of their world. “Quite often, the term technology is mostly used in three different contexts: when referring to a tool or machine, a technique, a cultural artifact, or a combination of the three” (NTI, 2007). Therefore, technology in contemporary society has economic, social, ethical and aesthetic dimensions which depend on the use to which they are put, the circumstances that prevail at the time they are used, and the environment they are put to use.

Literally, environment comprises the air, water and land in or on which people, animals and plants live. Environmental issues are of great significance to the whole of the region of the earth’s surface, the sea and the air that is inhabited by living organisms because every member of the biosphere is affected by significant changes in environment. Today, the humans (the controlling unit of the biosphere) have admitted that the environment is, at least in part, a product of centuries of centuries of laborious human intervention which have to some extent become artificial or technologically built, with tremendous impact on nature.

The natural environment encompasses all living and non-living things occurring naturally on earth or some regions thereof. It covers the universal natural

The Coconut

resources and physical phenomena that lack clear-cut boundaries such as air, water and climate as well as energy, radiation, electric charge and magnetism, not originating from human activity (Wikipedia, the free Encyclopedia). In contrast, the built environment comprises the areas and components that are significantly influenced by human beings. It is a technological environment, having as indicators of development factors such as: mechanized agriculture and agro-based industries, oil companies, good road network, land, sea and air transport industries, electric power supply, GSM companies among others. Thus, technology underlies urbanization which has created wonderful opportunities for good life for our people.

Paradoxically, just as technology has brought good life to urban and rural dwellers, it has also inflicted upon them some woes, creating mounting tension between the natural and technological environments. Let's spotlight this tension, taking cognizance of the associated environmental crisis and hence the worldwide concern over the future of the planet earth.

Crisis in Agriculture cum Agro-based Industries

Due to advancement in technology, modern agricultural techniques have changed. The change is brought about by

- (i) Mechanical factors, involving the use of tractors and agricultural equipments which help in ploughing, leveling, weed control and sowing etc.
- (ii) Chemical factors, involving the application of pesticides and artificial fertilizers.

Pesticides are used to kill pests. Fertilizers are used to provide nutrients to plants. It makes plants grow rapidly and contributes greatly to increase in crop yield. "Farmers the world over now use agrochemicals to increase the yield of their crops" (Bajah, Teibo, Onwu & Obikwere, 2001).

Unfortunately, increasing use of chemical fertilizer pollutes the environment and contaminates the surface and ground water resources. In the long run, the increased use of artificial (chemical) fertilizers will deplete the soil nutrients. Some of the constituents of the fertilizer will readily be soluble in water to produce a contaminated fluid which will get washed away into streams, lakes and rivers. The result will be the growth of algae and other undesirable weeds (Baja et al, 1992). The application of pesticides, namely, fungicide and insecticide without giving thought to the possible environmental effect will lead to poisoning of fish in ponds and rivers, killing birds and polluting the atmosphere (Gusau, 2007).

Crisis in Oil Company

In a contemporary society, industrialization is considered synonymous to development. Unfortunately, industrialization is taking it's toll on environment. To set up new industries, biologically rich habitats (which are essential for a healthy biosphere) are either pulled down or fragmented. Industrial discharge carries a variety

of organic and inorganic contaminants that disrupt energy flow/food chain. Industrial plants discharge, into air and water, a number of contaminants which inflict serious injury on the biosphere, leading to imbalance in the ecosystem. Bello and Balasa (2007) listed the major environmental problem linked to oil industry to include, deforestation, land, water and air pollution.

Due to industrial coal burning, considerable amounts of noxious gases like CO₂, CH₄, N₂O, CFCs are released into the lower atmosphere. Emission of these green gases results in global warming. To worsen the environment, SO₂ and NO₂ also emitted from industries cause acid rain and formation of smog.

Crisis in Transportation

In the history of transportation, perhaps the most spectacular progress made was the invention of locomotives. The introduction of the internal combustion engine ushered in the necessity to construct better roads for motor vehicles. As the world raced on in its insatiable appetite for development, sea vessels were invented. Achievement in the world transport industry reached its penacle with the invention of aeroplane.

Road-Based Transport Crisis

Perhaps, it is impossible to name an invention, over the past century, that has changed the lifestyles and behaviour of people as fundamentally as the motor vehicles. Infact, the major segment of our daily business depend on the manufacture, distribution, servicing and use of motor vehicles. For instance, without buses, taxis, cars or trucks, it would be difficult to get to work, go to school, get our farm produce and manufactured wares to market. Nevertheless, some people claim that the planet earth without automobiles would be a better place. But is the claim justified? Consider this:

Numerous pollutants are emitted from the exhausts of automobiles. These include:

- (a) Carbon monoxide: which is poisonous to man and other animals as it combines with the haemoglobin in the blood and minimize the oxygen-carrying capacity of the blood. The symptoms are: headache, fatigue, tiredness, unconsciousness and cardiovascular damage.

- (b) Oxides of nitrogen which:
 - (i) Are poisonous to plants and animals.
 - (ii) Causes eye irritations in man.
 - (iii) Attacks the lungs and reduces the oxygen-carrying ability of the blood.
 - (iv) Causes lung cancer and asthma.
 - (v) Is harmful to plants by reducing plant growth, its productivity and yield-rate.
 - (vi) Forms acid with moisture in the air and corrodes metal structures and stone work.
 - (vii) Dissolves in rain water to give rise to acid rain.

The Coconut

- (c) Unburnt hydrocarbons which:
 - (i) Causes lungs and skin cancer.
 - (ii) Forms photochemical smog.

- (d) Lead compound which:
 - (i) is poisonous to plants and animals.
 - (ii) Causes anaemia, stomach pains, kidney failure and mental retardation in children.

Allowing this situation to go unabated is, perhaps, akin to granting a proposal to sit on a keg of gun powder (a ticking time bomb, to exaggerate).

Sea-Based Transport Crisis

International trade has, invariably, become the hall mark of modern civilization, anchoring international relations. Much of the world's trade passes along certain well-charted ocean routes, using various kinds of vessels ranging from the passenger liner (which carry mainly passengers, express mails and limited amount of high-value freight) to the industrial carriers (which include the oil tankers that carry only petroleum and self-unloading colliers that ship coal).

Unfortunately, sea (ocean) transport is associated with a number of environmental hazards due to tanker accidents (groundings and collisions) which usually result in the discharge into the sea of oil or oily mixtures, noxious liquid substances and garbage. The main environmental effect of shipping accidents, according to Helsinki commission (2006) are:

- Pollution of the sea waters (in most cases a short term effect).
- Pollution of sea bed (including effect of spawning ground etc.)
- Pollution of the atmosphere (especially in the case of fire)
- Killing of sea birds and mammals, and
- Pollution of the shores (both recreational and wildlife habitats can be seriously affected).

Stone, Cozens and Ndu (1999) painted a gruesome picture of the same scenario. Hear them.

Oil often licked into the sea when oil tankers are loaded or unloaded and may be released in large quantities when a tanker is wrecked, or off-shore oil rig explodes. Oil causes the death of sea birds, both by poisoning them and by sticking their feathers together so that they can no longer fly. When washed up on shore, oil also kill most of the plants and animals living there.

Air-borne Transport Crisis

As a pointer to accelerated global development, there is a phenomenal growth in the world's aerial transport of passengers, mails, freights, etcetera. Incidentally, various pollutants such as carbon monoxide (CO) and carbon dioxide (CO₂), oxides of nitrogen (NO and NO₂), oxides of sulphur (SO₃ and SO₂) and Chlorine (Cl₂) are

spread in the atmosphere through airplanes. Jet planes travel in the stratosphere and disrupt the ozone layer by emitting these pollutants.

According to NTI (2000a), nitrogen oxides such as NO and NO₂ are formed by supersonic transport jets (SSTs like the American Boeing 2707s, the Anglo French Concorde and Russian Tupolov-144, traveling at very high speeds at high altitudes (> 20km) in the stratosphere with consequent catalytic reduction in the abundance of ozone.

Ozone layer acts as a shield scattered in the stratosphere. It absorbs the sun's ultraviolet (UV) radiation and keeps it away from the earth's surface. The dissociation of ozone is catalyzed by nitrogen oxides, carbon monoxide, sulphur oxides (SO₃, SO₂) and other noxious effluents generated through various human activities. One chlorine atom can destroy thousands of ozone molecules, similar to action of NO and NO₂.

Ozone depletion is a cause of global concern as it's thinning will let the lethal ultraviolet (UV) rays pass and reach the earth's surface which will result in cancer, eye damage and will reduce immunity.

Crisis in the Power Industry

By far, the most useful, convenient and important form of energy in modern civilization is the electrical energy. It provides the power by which we operate radios, televisions sets, computer systems, including the practice of engineering, medicine and surgery. Incidentally, due largely to failure on the part of national grid (in the Nigerian context) and of course, the need to complement the supply of electricity by power stations, the use of electrical generators has continued to be popular. Infact, electric generators have become the major source of power supply to private residences and public houses, including commercial buildings such as hotels and guest houses. But this popularity goes with serious consequences. Man has consciously and unconsciously released billions of carbon dioxide to the aggregation of green house effects. Perhaps, in order to mitigate the associated catastrophic effect of global warming, technological progress introduces nuclear power supply.

Nuclear power plants essentially use steam to drive electricity-generating turbines, producing rotational kinetic energy, which is then used to generate electricity. The steam is generated from the energy obtained from the fission of Uranium-235. The fission reaction takes place in the controlled nuclear fission reactor, which serve as a furnace.

Nuclear-power electrical generator provides clean and abundant energy that complements oil and natural gas, boosting industrial expansion of both developed and developing world. However, nuclear power production suffers horrible disadvantages. The normal running of nuclear power stations produces nuclear wastes which are immediately dangerous, having the capability of being subtly absorbed into the environment where they can wreak long-term havoc. The question of how to achieve a perfect disposal of nuclear wastes, to the safety of humanity is still an issue. Consider this:

The Coconut

After world war II, 120,000 tons of toxic materials, mostly phosgene and mustard gas, was sealed in ships and sunk at sea, some to the north-west of northern Ireland. Russian scientists have warned that these materials are now in danger of leaking ... A naval captain under the soviet regime was concerned about radiation leaks from the reactors of sunken nuclear submarines. When he published locations of these, he was arrested (Awake, 2003).

The specter of a nuclear reactor gone awry still exists. The worst incident occurred in 1986 when Chernobyl nuclear reactor (in the soviet union) malfunctioned, resulting in a considerable release of radioactive material with the attendant loss of dozens of lives. “Accidents in the use of nuclear reactors cause carcinogenic injuries to the health of all organisms, and genetic mutations” (NTI, 2000b).

Crisis in GSM Telecommunication Industries

Unarguably, the 21st century has witnessed the fastest global diffusion of technology in human history. The pervasiveness of technology is perhaps most apparent in the proliferation of cell phones. Without doubt, global system of mobile communications (GSM) offers enormous advantage of making people accessible, virtually, anytime and any where. Advanced models of cell phones enable users to access the internet, send and receive e-mail and text messages, watch television, listen to music, take photographs and navigate by global positioning system (GPS). But the picture is not all rosy. Infact, the GSM technology has a horrible downside.

While evidence remains inconclusive, there are increasing concerns about the frequent use of mobile phones on human health. The kind of electromagnetic field generated by cell phones on the human brain is shown to have adverse effect of long-term exposure. Research undertaken so far has hinted that excessive exposure to electromagnetic fields could cause such undesirable effects as memory loss and brain tumors (www.itu.int/telecom).

Summary and Conclusion

We live and work in technological structures, using electricity and cell phones to our comfort and convenience. We are transported across the globe (by land, on water and in air) by vehicles that are by-products of technology. Mechanized agriculture and (agro based) industries enable us to produce more and better food. Infact, no food in modern society is without recourse to technology, either in its origin, packaging and processing, transportation and vending. Industrial firms have created, for our people, wonderful opportunities for good life.

Paradoxically, just as technology has brought blessing to mankind, it has inflicted mankind with woes. The biosphere is put at risk by discernable human (technological) activities which have resulted in

- A steady decline in tropical rain forests.
- Land/soil pollution.

- Release of chemical fertilizers, sewage, oil and toxic wastes to lakes, ponds, streams and rivers, including the deposition of nuclear wastes in oceans (deep seas).
- The release into the atmosphere of green house gases such as carbon dioxide (CO₂), Chlorofluorocarbons (CFCs), nitrogen oxides (NO, NO₂) with the attendant formation of acid rain and depletion of Ozone layer which is catalyzed by chlorine (Cl₂), carbon monoxide (C₀), sulphur oxides (SO₃, SO₂) and other noxious gases which accelerate global warming.
- Auto, aerial and industrial pollutions constituting the bed rock of climate calamities, having jointly changed the chemistry of the whole of our background atmosphere.

So now, what we are witnessing is a race between development and catastrophe. In a couple of years to come, the victor would have emerged. The jackpot question is this: who will win the race? The answer, of course, is simple: Catastrophe. And the implication is clear: All plants and animals (including the homosapiens) would have gone extinct – Environment would have been sacrificed on the alter of development. This scenario has jostled the United Nations (UN) to the reality that, by and large, no development is more important than a healthy environment. Accordingly, the UN is seeking to salvage the environment. But can our environment be salvaged? Here is the therapy.

Eliminating Ignorance

Ignorance is a precursor to catastrophe. The first step to making amend to environmental damage is to produce an environmentally – friendly population of people founded on adequate awareness of environmental impact of deforestation and pollution. This proactive approach is achievable through the use of posters, mass media (radio, TV programmes, newspapers) and the formal school settings. A comprehensive environmental impact awareness is a *sinequanon* to being environmentally friendly.

Checking Deforestation

In an effort to check deforestation, NTI (2000a) opined that there is need for annual tree planting campaign which is meant to remind us that we should not, for our own good, fell trees; rather, we should plant more. Forest (plants), according to him, help to restore nature's balance of water, carbon and nitrogen cycles.

Controlling Land/Soil Pollution

Land/soil pollution is intensified by the accumulation of pesticides and chemical fertilizers. A sensible control measure, therefore, will be to limit the use of some pesticides and fertilizers. Farmers should be educated about the correct usage of fertilizers to limit run-off.

Controlling/Reducing Air Pollution

Air pollution can be greatly reduced by

The Coconut

- Regular servicing of machinery, motor vehicles, etc to ensure that fuel is burnt efficiently and so reduce the production of pollutants, especially carbon monoxide and soot.
- Reducing the lead-content of motor fuel.
- Reducing the fleet of vehicles on the entourage of officials.
- Fitting the exhaust system of motor vehicles with catalytic converters to remove oxides of nitrogen, carbon monoxides and hydrocarbons.
- Treating the waste gases of industries to remove sulphur dioxide and oxides of nitrogen and recycling the products formed.
- Passing waste gases from factories through appropriate fibres and absorbers to remove the pollutants before they are discharged into the atmosphere.
- Finding a good alternative to CFCs. This will be a substitute (such as CF_3CH_2 and CH_3CH_2) with a low ozone-depleting potential.
- The world's greatest polluters should be compelled to take action to limit global warming. This will entail, among other things, putting in place, legally binding limit on carbon emission.

Controlling/Reducing Water Pollution

Measures to reckon with include:

- Treating sewage in sewage plants (in order to be rendered biodegradable) before being discharged into rivers and seas.
- Recycling industrial wastes, if possible, otherwise, treating discharges in controlled amounts.
- Excessive use of pesticides, insecticides, weed-killers or fertilizers should be avoided.
- Building nuclear waste silos for storing radioactive wastes so that ground water does not become contaminated with radioactive materials.
- The loading and off-loading of oil tankers should be thoroughly supervised. Discharges into the sea of oil or mixtures containing oil in any form (crude oil, fuel oil, oil sludge, refined products inclusive) should be totally prohibited. The scope of this prohibition should encompass oily water from the machinery spaces of any ship, as well as from the ballast or cargo tanks of oil tankers.

Controlling the Negative Impact of Cell Phones

As a way of keeping off the possible radiation effect on the brain, of GSM usage, users should take the simple precautionary measure of alternating ears every few minutes during a long phone call.

References

Awake (2003). *Saving the Environment. How Successful have we Been?* Awake: Watchtower Bible and Tract Society of New York, Inc.

- Bajah, S. T. Teibo, B. O; Onwu, G. & Obikwere, A. (2001). *Senior Secondary Chemistry. Textbook 1*. Ikeja: Longman Nigeria Plc.
- Bello, M. & Balasa, M. M. (2007). Conventional Sources of Energy for Humankind. In Okebukola, P. and Akpan B. B. (Eds.). *Strategies for Environmental Education: Issues on Minerals and Energy Resources. Environmental Education Series No. 11*. Ibadan: Science Teachers Association of Nigeria.
- Gusau, B. U. (2007). Chemistry and Environment: Integrating Environmental Issues into School Chemistry Curriculum. In Okebukola, P. & Akpan B. B. (Eds.). *Strategies for Environmental Education: Issues on Minerals and Energy Resources. Environmental Education Series No. 11*. Ibadan: Science Teachers Association of Nigeria.
- Helsinki Commission (2006). *Maritime Transport in the Baltic Sea*. Available: www.helcom.fi .
- NTI, (2000a). *NCE/DLS Course Book on Integrated Science. Cycle 4, Modules 1,2,3*. Kaduna: National Teachers Institute (NTI).
- NTI, (2000b). *Course Book on Integrated Science. Cycle 2, Modules 1,2,3*. Kaduna: National Teachers Institute (NTI).
- NTI, (2007). *Basic Science and Technology*. Kaduna: National teachers Institute (NTI).
- Stone, R. H. Cozens, A. B. & Ndu, F. O. C. (1999). *New Biology for Senior Secondary Schools*. Lagos: Longman Nigeria Plc.