

SCIENCE AND EFFECTIVE LIVING IN THE NIGERIAN ENVIRONMENT

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Abstract

This paper on science and effective living in Nigerian environment exposed the importance of science in our daily lives. The paper wondered why after studying science in Nigeria schools, the attitude of the people towards the environment is not positive. It portrayed how the environment is negatively affected by some activities of individuals and even government policies. Recommendations were made on how to preserve our environment. These include: prohibiting the use of gutters and drainages as dumping ground for refuse and bringing culprits to book. Another recommendation is that the scientific attitude should be developed and cultivated in the citizens as personality traits for effective living in our society.

Introduction

Looking at science as the study of nature, one will accept that man has practiced science since creation. Most of the activities of man are science-based. However, the systematic study of science can be said to have started with the likes of Socrates, Ptolemy, Aristotle, Copernicus and Galileo. Science by its nature is dynamic. As such, it has grown and developed over time to what it is today. This is not to say that science has attained its peak since every new scientific knowledge leads to search for more. This is so because there is no certainty in science.

Discoveries in science have led to better life for man. In fact, science is a blessing to man. Thus, our everyday life seems to revolve around science. There is so much to learn for effective living in our environment such as effect of global warming and management of the environment to prevent diseases. Hence, all nations of the world expose their citizens to the study of science. This may not necessarily be to make everyone a scientist, but for one to have enough knowledge to understand what is happening around him. Science is taught in all levels of education in Nigeria. The main objective of teaching science to children is to get acquainted with the world around them. The children are not only taught the facts about nature but also the process of science as well as development of expected attitude associated with the scientific nature.

Science is taught in Nigerian schools from primary school level of education (FGN, 2004). So everyone that studied in Nigeria must have been taught some rudiments of science. However, the behavior of some people leaves much to be desired. For instance, dumping of refuse and waste. Olukanni et al (2014) observed that there is indiscriminate dumping of waste in drains and littering along road sides in municipality. These solid wastes are most likely dumped by people living around the drainage who are supposed to benefit from the function of the drainage. What about houses? Are they being taking care of for effective living? What is the quality of the indoor air? Fubara et al (2011) carried out autopsy on 75 corpses in Port Hacourt and found that 48% are as a result of accidental carbon monoxide poisoning. The gas they say is related to fumes from generator, car exhausts, poorly ventilated rooms and enclosed chambers. A well ventilated room is of great importance for healthy living. Winqvist et al (2018), state that ventilation plays important role in creating a healthy and pleasant indoor environment. This knowledge is not to be ignored. One is expected to transfer the knowledge

acquired in the classroom to the environment and to use it in our daily living. The knowledge is to make one to be interested in what is happening in his environment, in our communities and in our world at large to live effectively in it.

Effective living in this context refers to the totality of what makes life worth living. It involves the interaction with one another and even the choices made. It involves how the environment is appreciated; how to make good use of it in such a way as to preserve it even for generations to come. While enjoying what nature has provided, there is the need to protect the environment so as to preserve nature.

All around us are signs that all is not well with the environment. There is an outcry about the degradation of our environment. Hence there is a clarion call for people to make conscious efforts of taking care of our environment; to make our life better and worth living (Eguabor, 2001; Olagunji, 2002).

Culling from Rinmak (2010), Akpan, (2010) posits that caring for the environment demands that people are given information, knowledge and skills and that the people have the attitudinal dispositions which are receptive to desirable change. This being the case, there is need for this discourse which is on science and effective living in Nigerian environment. It is aimed at telling or reminding people of the things that need to be done in using knowledge of science to enjoy the environment and keep it safe. It will also attempt to expose the nature of our environment and the causes of environmental degradation. There is need for us to be really concerned about our environment and its associated problems and able to use knowledge of science to contribute towards the solution of current problems and how to prevent emerging ones.

What is Science?

Various individuals have defined Science in in various ways. It is therefore not easy to have one single definition of science. Arun (2008), defines it as systematized body of wisdom and knowledge which can give rise to greater and greater inventions. Chukwu, et al (2009) see it as the interaction between man and nature hence it is seen as a human enterprise. For Zimmermann and Britt (2012) science is a systematic and logical approach to discovering how things in the universe work. The knowledge of Science is based on facts not individuals

opinions. It is based also on observable experiences. Science is therefore a concerted human effort to understand nature and how it works.

The main task of science is to discover patterns or relationship between phenomena and then apply it in other situations which can lead to inventions. This can be done through observation of the natural world or through experimentation. Science attempts to render into meaningful categories the seemingly chaotic diversity of our sense experiences (Chukwu, et al. 2009). The nature of science is such that it is constantly seeking to falsify existing laws and theories. Hence no science knowledge is static. It is subject to change due to new discoveries. Scientific knowledge is tentative; there is no certainty about it only degrees of probability. This nature of science causes scientists to always seek for better knowledge and better ways of carrying out investigations. All the activities are aimed at making the life of man better; to help him to conquer his environment and so live effectively in it.

Scientific knowledge is obtained using the scientific method which involves the following steps according to Blystone and Blodgett (2022)

- Define a problem
- Gather background information
- Formulating hypothesis
- Make observations
- Testing the hypothesis
- Drawing conclusions to accept or reject the hypothesis

The conclusion drawn after the investigation provides fact about the phenomenon under study. The fact will however not be accepted as scientific knowledge until it is published in a reputable journal after a peer-review. If the knowledge makes a new contribution to knowledge, it may lead to discarding the old idea or modifying it. Thus scientific knowledge can always be challenged with evidence.

The method seems to involve a long process, but it is worth it because if a conclusion is drawn from it, one will be sure of what one is doing or saying. In this regard this paper suggests that this process should be applied to our daily lives. It calls for a careful analysis of whatever we want to do. Conclusion should not be taken before the first step or based on ordinary feelings,

opinion or hearsay. Many of our gigantic projects failed because time was not taken to critically plan them. For instance, the Ajaokuta Iron and Steel Project established since 1979 has not materialized up to date or the objective for which it is established has not been achieved (Adegbite, 2020). Science is based on some assumptions such as: The world is real; the universe exists whether one can sense it or not. It is not just an imagination.

Reasons for Studying Science

Individuals study science to make their own contribution to knowledge. Scientists rejoice when being able to make new discoveries or through their findings explanation are offered to an existing fact which could not hitherto be explained. Discoveries in science can also make one famous and offer him opportunity to write his name on the sands of time.

Science is also studied to satisfy simple curiosity. The knowledge obtained enriches our understanding of our world and our lives. People study science too to earn a living. Consider science teachers and those who work in research institutes. The urge to better the life of people can also push people into the study of science. Researches are carried out to investigate a particular observation. The results can be sent to that community; it may call for an advocacy campaign. For instance, a research was carried out to analyze the locally produced salt used in parts of Plateau State especially in Langtang and Shendam areas of the state and it was found out that it lacked iodine, an element highly required in diet for the prevention of goiter. An advocacy campaign was carried out to intimate the people of this finding (Longdet, et al 2013)

The society encourages people to study science as this offers ways of improving the lives of people. A good example is found in studying about the movement of the earth. This can help to avert the casualties recorded during and after earthquakes, landslides, flood and volcanic eruptions. The society also encourages the study of science for economic development. Example, if a feasibility study is carried out in Langtan and Shendam areas of Plateau State, a salt industry that will make use of the local salts as raw materials may be sited there and that will boost the economic activities of that area.

Much science is done in order to understand and control our environment. Some years ago, many children were seen suffering from polio but with the polio vaccine, polio is almost

eradicated in our country. Any child that suffers from polio now should hold their parents responsible. In fact, the study of science has brought about so many changes in our daily lives.

Science in Our Daily Lives

Science plays a very important role in our daily lives. Science came to relieve humankind from sufferings, ignorance and to control nature (Arun, 2008). Every one of us enjoys the luxury brought about by science. Think about all kinds of gadgets of music, entertainment, transportation, medicine and communication. Science brought about modernization. Our lives today are better than what they were some years back. One can travel hundreds/thousands of kilometers within hours using aero planes or motor cars. Modern ships have overcome turbulent waters and are safe for transportation of goods.

Think about communication. This has ‘reduced’ the world into a global village. One can sit in one place and communicate with people very far away. Even meetings can now be held with people located at different parts of the world participating and contributing to the issues being discussed. These are made possible with telephones, mobiles, wireless, e-mail and internet. Another benefit from electronic communication is e-banking. One can sit at the comfort of one’s room and transact business in the bank without any problem. So many examples of ways in which science has made our daily lives easy are made possible by electricity and electronics.

Electricity is one of the major contributions science has made to mankind. Can you imagine a life without electricity? No industry will function; all gadgets for music, entertainment, communication would pack up. Man has been able to overcome even weather changes with electricity; using air-conditioners when it is hot and heaters when it is cold. Science has made the life of a house wife easier with the use of refrigerator, deep freezers, deep fryers, pressure cookers, micro waves, washing machines, and so on. Food production cannot be left out of this list. There is improved and variety of food made possible by the use of improved seedlings. The improved seedlings are provided for farmers through the Ministry of Agriculture. These varieties give better yields with high quality products (Mojeed, 2022)

Medicine and surgery are areas that cannot be overlooked. The improvement in medical treatment is tremendous. Just think of the challenge with HIV and Ebola virus. Science has helped to cure man of terrible diseases by lengthening his years and making him healthier. In

the field of surgery too science has done wonders. Think of heart surgery and heart transplantation all of which have almost become ordinary things today. In fact science is a blessing to humanity.

Howbeit, science has its shortcomings. For instance, mankind is always in constant fear of mass destruction using nuclear weapons. The kinds of films sometimes available to children in the internet are inimical to their moral development. In addition, the internet (social media) can be used to spread wrong information or unsubstantiated rumors and conspiracy theories(Vicario et al (2016).

So to enjoy and continue to enjoy science one must use it in the right way and positively. One needs to have facts, right disposition and the right attitude. Those who study science have some characteristics attributed to them. These characteristics are called scientific attitudes.

Scientific Attitude

Attitude according to Oxford Advanced Learner's Dictionary of Current English is the way you think and feel about something/somebody. The way that you behave towards something or somebody shows how you think or feel about the person/thing. For Chukwu (2010), attitude is what people think and or feel that lead them to be prejudiced, nationalistic or not. The attitude of an individual is what propels one to respond to a situation in a given manner. The response may be positive, negative or indifferent. Whereas positive attitude brings about growth and development to a nation, negative attitude or indifference negates national development especially achievement of stated national goals. This is why Chukwu and Duguryil (2011) call for attitudinal change if Nigeria is to achieve her national goals and aspirations.

The scientific attitude is not the attitude of people towards science or the study of it. It is the characteristics possessed by those who study science or carry out scientific activities. Some look at it as scientific attributes. According to Olasehinde and Olatoye(2014), scientific attitude is the ability to react consistently, rationally and objectively in certain ways to a novel or problematic situation. It is a composite of a number of mental habits or of tendencies to react consistently in certain ways to novel or problematic situations. These attitudes are usually associated with the mental processes of scientists. Though some of the scientific attitudes are

characteristics of scientists, others are attitudes expected in all human endeavors. They are personality traits valuable not only in the classroom but also in other areas of human experiences for everyday living. Thus, Chukwu and Duguryil (2013) call on Nigerians to imbibe the scientific attitude in order to solve some of the problems facing the nation especially peace and security as well as effective living in our environment.

People have made attempts to identify the scientific attitudes. (Rational enquirer, 1990). The attitudes identified can be grouped as follows: curiosity, rationality, open mindedness, intellectual honesty, humility, creativity, and responsibility, suspended judgment, and perseverance, tolerance of uncertainty, objectivity and painstaking. These attitudes if developed in students and hence the citizens will go a long way in solving many of the myriads of problems confronting the nation today.

Environment

Environment is the natural world in which people, animals and plants live. It has also been seen as any space where matter can exist including man himself. For Olagunju (2002), environment is the physical, chemical and biotic conditions surrounding a living organism. It has to do with all the things within a system that are capable of affecting the behaviour, growth and development of the interacting living things within the system. It is a whole complicated system with many interacting components. Akpan (2010) painted a picture of the environment thus:

The environment contains plant communities of trees and woody vegetation. These provided canopies in which the trees' tops (referred to as crowns) touch each other providing shade to the interior space and soil. Where the land has a lot of flora and fauna which together interplay with the carbon (iv) oxide, water and oxygen actions in photosynthesis. -A process responsible for the regulation of life sustaining processes of the ecosystem.

Also have animals of various kinds in the environment; both wild and domesticated ones. All human activities which interact with and affect the physical environment are included. A clean and healthy environment is one of the most important human basic needs. A healthy

environment is essential for health and wellbeing of the planets and its inhabitants who depend on it for food, water and air (Nzewi, 2001). Man was an integral part of the ecosystem, and first subsisted like other animals, manipulated biotic resources in a manner that did not radically alter the ecosystem, structure and functions (Rinmak & Dayal, 2002). Our forefathers seem to have appreciated the environment much more than the present generation hence they did not allow indiscriminate waste or destruction of natural resources (Eguabor, 2001).

Our environment is being degraded due to increase in population and modernization. These have so affected the environment that it has become degraded. Though man keeps talking about sustainable development and so continues to discover and build new technologies, this development should be such that meets the need of the present without compromising the ability of future generations to meet their own needs.

Man needs an environment that is rich in oxygen for good metabolic processes. The environment is supposed to be pleasant to the eye and beautiful, not littered with non-biodegradable materials or refuse dumps here and there. These refuse dumps constitute health hazards negating effective living.

Environmental Degradation

Degradation is the process of reducing the value of something by damaging or making it worse. Environmental degradation means the process of damaging the environment, making it difficult for plants and animals to make the best of their environment. It also implies depletion of the environment, a situation in which renewable resources are used up faster than can be replaced. -In such a case, the environment is said to be exploited (Akpan, 2010). .

Little attention was paid to the environment and climate change. Hitherto, environmental problems were thought to be limited to the developed nations but now it is clear that it is far more embracing (Okechukwu, 2002). All nations are affected in one way or the other. Okechukwu (2002), observed that some government policies such as self-sufficiency in food and raw materials, self-employment, rural development as well as urbanization contributed to degrading the environment by putting increased pressure on the natural environment.

In Nigeria, evidence of degradation of the environment abound. Prominent among this is the presence of refuse dumps which is an indication of poor management of solid waste. What heralds one into any urban area is the presence of refuse dumps or cellophane bags/papers littering everywhere. Most of these bags are not biodegradable so the hips keep piling up. Even the biodegradable ones, if not properly disposed constitutes health hazards as they are comfortable habitat for pathogens. The presence of these refuse dumps is as a result of indiscriminate dumping of refuse. It is clear that many homes produce more solid waste now than before. Many of such wastes result from the packaging of items purchased from the market and shopping centres.

Some years ago, refuse from homes used to be poured into uncultivated farmlands where it decays and becomes manure. These days as a result of urbanization, the farm lands are disappearing and most of the wastes are not biodegradable. The farmer does not need them in his farm so they are dumped any how defacing the environment.

In recent times, the use of disposable plates, spoons and cups is in vogue, during occasions, people are served foods and drinks with these items. In addition they are served packaged water. At the end of the occasion, the whole arena will be littered with these disposables. It is usually an eye sore. The unfortunate thing is that these disposables are made of plastics which are not degradable (Lee, 2018).

The worst kind of degradation is found in the Niger-Delta region. Here the land is not only depleted by mining activities but also by oil spillages. According to Obi (2012), a report of the United Nations Development Programme (UNDP) has it that there have been 6,817 oil spills between 1976 and 2001. This accounts for a loss of three million barrels of oil, out of this, only 30% was recovered. He stated that the Nigeria National Petroleum Corporation (NNPC) places the quantity jettisoned into the environment as 2,300 cubic metres with an average of 300 industrial spills annually. This quantity may be more considering that minor spills are not accounted for. This oil spills has devastating effect on the environment. Ordinioha and Brisiba (2013) found that oil spills could lead to 60% reduction in household food security and a 24% increase in the prevalence of childhood malnutrition

Obi (2012) observed that the Niger-Delta has a well-endowed ecosystem with high concentration of biodiversity there is abundant flora and fauna as well as arable terrain that can sustain a wide variety of crops, trees and more species of fresh water fish but that the region could lose 40% of its inhabitable terrain in the next 30 years due to dam construction and carelessness of the oil industries.

Natural disaster has also taken its toll on the depletion of the environment. Culling from Okorie (1992), Ononugbo (2004) states that unchecked gully erosion is widespread in most part of Eastern Nigeria: 600 sites in Anambra, 300 in Imo, 59 in Akwa-Ibom and 30 in Cross River states. This erosion destroys extensive farmlands rendering families homeless and helpless. Typical example is the flood of 2012 which destroyed so many farmlands and rendered families homeless in Nigeria. Globally, the environment is being degraded as result of deforestation, desertification, erosion, flood and pollution.

Deforestation is the act of cutting down or burning the trees in an area. Akpan (2010), sees it as cutting down the trees at a rate difficult for nature to replace. Some other people see it as clearing the forest on a massive scale often resulting in damage to the quality of the land. Deforestation is the permanent destruction of forests to make the land available for other uses. It implies that the trees in the forest are removed without replacement. The removal may be gradual due to the simple activities of women in collecting firewood (Ononugbo, 2004) or the removal of trees on a space of land due to developmental activities like building of roads or urbanization.

Deforestation is not always caused by man's activity; some natural disaster such as wildfire also contribute to deforestation. Housing in both rural and urban areas also lead to deforestation as tree are usually uprooted to create space for the house.

Forests contain the largest number of plant and animal species of any ecosystem and are therefore significant bioactivity reserves. Forest canopy protects soil from raindrops that strike the surface of the earth. This reduces soil erosion. The tree also helps in water cycles. They trap water in their roots which they eventually send to the atmosphere. Without the plants, the climate becomes too (Christain 1999).

In the United States, a group called union of concerned scientist reported that in 1990s' deforestation was sixteen million (16,000,000) hectares a year and was responsible for 17% of global warming pollution. With effective programmes such as reduce emission from deforestation and degradation, (REDD) the pace has come down. Other activities include providing payment for ecosystem services (PES) and strengthening governance and enforcement mechanism (uscusa.org). In Nigeria emphasis has being on tree planting campaign. Adelaja (2014), reported that National Emergency Management Agency (NEMA) advice Nigerians to plant trees. This will not only reduce deforestation but will also control windstorm and global warming.

Pollution

Pollution is the action of contaminating the environment with waste. More often than not the waste from man and animal are spread uncontrollably in the land, air and water. Hence we have land pollution, air pollution and water pollution. This paper will however dwell more on air pollution.

Air pollution is the introduction of harmful materials unto the atmosphere. These materials may have adverse effects on human beings and the ecosystem. It may be in form of solid particles, liquid droplets or gases, WHO report of March 2014 stated that 7 million premature deaths in the whole world could be linked to air pollution (WHO 2014).

Pollutants (i.e. substances causing pollution) may be of natural origin e.g. gases from volcanic eruption or manmade such as carbon monoxide from motor vehicle exhaust. Major Pollutants include,

Sulphur dioxide and Sulphur trioxide, Nitrogen oxides e.g. nitrogen dioxide produced during thunderstorms, Carbon monoxide and Volatile Organic Compounds (VOCs). The VOC are of two types namely methane and non-methane Volatile Organic Compounds (NMVOCs). Methane is a greenhouse gas which contributes to global Warming. The aromatic NMVOCs e.g. benzene, toluene and xylene are suspected carcinogens which may cause leukemia with prolonged exposure to them. 3 butadiene (but 1, 3 diene) ie very toxic and often associated with industrial use. Other pollutants include Particulate matter (PM): Some fine particles of solids or liquids are suspended in the air. Chlorofluorocarbons (CFCs): These attack the ozone

layer depleting it thus allowing ultra violet (UV) rays to reach the earth's surface. This can lead to skin cancer, disease of the eye and can cause damage to plants.

Nasty odours from garbage, sewage and industrial processes also pollute the environment. Another important pollutant is called persistent organic pollutants (POPs). They are organic substance that resists degradation through chemical, biological or photolytic processes. They persist in the environment and accumulate in human and animal tissues. They may have significant impacts on human health and the environment. In Nigeria, though efforts are made to fight soil pollution little attention is paid to fighting air pollution (Akpan, 2010).

Another pollution of great importance is the black soot in the Niger Delta especially Port Harcourt the Rivers State capital. The black soot is said to result from illegal burning of crude oil. Giles (2018) captured it thus: "you're wiping your face with handkerchief and everything is black. You're trying to clean your car and everything is black. Or you look at the soles of your feet and it is just pitch black" The increasing outcry over the presence of black soot is because of the resultant poor air quality and the health hazards that it posits. Oyadonga (2018) enumerated the following respiratory tract irritation, allergies, irritation of eyes, irritation of the skin, lung cancer, chronic bronchitis and so on as health problems associated with black soot.

In the houses too are some biological sources of air pollution. These may be from pets, skin flakes, decomposed hair; dust mites in beddings, carpets, molds from walls. Soil and surrounding gardens can produce pollen dust and mold; if air is not allowed to circulate very well these pollutants accumulate more than they would have in nature.

The source of these pollutants is mainly from burning of various types of fuel. Having seen that these pollutants are hazardous we need to be more careful in our environment. We need to avoid activities that pollute the environment or allow others to do so.

Consequences of Air Pollution

Air pollution has been found to be responsible for many conditions including respiratory infections, heart disease, and lung cancer. The effects may lead to difficulty in breathing, wheezing, coughing, asthma and worsening existing respiratory and cardiac

conditions. These will cause increased medication, hospital admission and premature death. The little money which would have been used for development of people may be spent on medication.

Studies have shown that in women, air pollution is associated with schematic stroke and incidences and mortality from coronary stroke. Women are exposed more to some of the pollutants due to constant burning of fossil fuel for heating at home (Nzewi 2002).

Conclusion

The place of science in our daily lives can never be over emphasized. It has made life better; be it in the application of its findings or the scientific attitude. Though it has its shortcomings, if it is positively applied, it is a blessing and makes us to live effectively in our environment. In recent times, the environment has suffered degradation. Though the degradation may be caused by natural processes, the activities of man have contributed greatly to the degradation. This degradation affects our effective living. Those activities were carried out over time and no matter how little it might have been it had its effect in the environment. However, all hope is not lost since we can work towards making our environment better. This implies that there is need for everyone to be ready to do whatever he/she can to preserve our environment. Every effort made, no matter how small, will contribute towards the preservation of our environment and make it friendlier and better for us.

Recommendations

1. The scientific attitude should be developed and cultivated in our citizens as personality traits for effective living in our society.
2. Everyone should be aware of the consequences of degrading our environment and be ready to contribute to making our environment better.
3. People should be enlightened on the need to live in well ventilated houses to avoid accumulation of pollutants in their bodies. Before any house is approved for building. The plan must show evidence of proper ventilation. This should not be done only in the urban areas but also in the rural areas. The local governments should establish housing inspectorate unit whose responsibility will be to enforce the laws guiding effective housing,

4. The call for tree planting should be taken seriously because the trees do not only help to absorb the carbon dioxide but also produce oxygen highly needed in the body for metabolic processes, Government should therefore enact a law compelling every family unit in the community; be it in rural area or urban area to plant trees in and around its abode and vicinity.
5. People should learn to use reusable products instead of disposables. For instance serving with disposables plates, spoons and cups during occasion should stop. We should also learn to reuse some products like cellophane bags.
6. People should make more use of compact fluorescent light bulbs because they give out less heat.
7. There should be a law compelling schools, ministries and large organizations to operate school buses and staff buses to reduce the number of cars on the roads. This will go a long way in addressing the critical issue of introducing carbon dioxide into the atmosphere.
8. To reduce the amount of heat in the environment, light should be turned off when not in use.
9. Refuse from homes should be sorted so that non degradable ones could be packaged for recycling or disposed properly.
10. The use of gutters and drainage as dumping ground for refuse should be prohibited and culprits brought to book.

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