



ASSESSMENT AND ESTIMATION OF ACTIVITIES IN THE REDUCTION OF CLIMATE CHANGE AND ITS EFFECTS ON PEOPLE AND ENVIRONMENT IN NIGERIA

¹ Oshati T, ²Pelemo O.J, ³Ofordu C. S, ⁴Malizu L and ⁵Adamu I.S.

¹National Productivity Centre, Ibadan,

^{2&5}Remote Sensing/GIS ³Meteorology Section

⁴Swamp Forest Research, Onne, Port Harcourt

^{2, 3, 4&5} Forestry Research Institute of Nigeria

Corresp. Email addresses: oshatiti@yahoo.com, pelemo03@yahoo.com

GSM No: 08023170934/08066421312

Abstract

The study assessed and estimated the activities that help in the reduction of climate change and its effect on people and environment in Nigeria. The aim of the study is to assess the amount of CO₂ equivalent that would be saved if simple steps were taken to reduce impacts on the planet. Questionnaires were administered to 200 students of University of Ibadan, Nigeria. About 85 per cent questionnaires were recovered. Software developed by USEPA was used to analyze the data. Based on these activities, 1745kg of CO₂ equivalent was avoided per year. This is equivalent to

the emissions from driving a car 6602.96km. Therefore, if all students in University of Ibadan took these actions, they would save a total of 131,802,909,337kg per year. This is equivalent to the emission from driving a car 498,789,940,025km. This is equivalent to the emissions from 26,293,025 passenger vehicles. This study recommends that some activities should be reduced to save our planet.

Keywords: Climate change, Questionnaires, CO₂ equivalent, Emission

Introduction

The Earth's climate is changing rapidly. Scientists trying to find out what's causing climate change work like detectives, gathering evidence to rule out some suspects and to ascertain just who is responsible. It's clear, based on over a century of scientific investigation, which humans are responsible for most of the climate change we've seen over the last 150 years. Humans are not the only suspects. The climate has changed throughout the Earth's history, well before humans evolved. The Sun is the primary driver of the climate. Roughly speaking, global temperatures rise when more energy from the Sun enters the atmosphere than returns to space through the atmosphere. The climate cools any time more energy returns to space than comes in from the Sun. While humans can influence that balance, other factors, from continental drift and changes in the shape of the Earth's orbit to variations in the Sun's activity and phenomena like El Niño, can all influence the climate. Considering the pace of climate change today, scientists can rule out most of those suspects: some happen too slowly to explain current climate change, while others move in small cycles, not long trends, and others only influence the climate in part of the planet. Scientists know about these factors and can account for them when assessing human-caused climate change. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states: it is a greater than a 90 percent certainty that emissions of heat-trapping gases from human activities have caused "most of the observed increase in globally averaged temperatures since the mid-20th century" (IPCC, 2007: Climate Change 2007)."

Rising of Carbon dioxide (CO₂) from human actions: Scientists can measure the increase of atmospheric carbon dioxide over the last 150 years. By comparing the type of carbon being added

to the atmosphere, they see that the kind of carbon released by burning coal, gasoline, and natural gas is diluting the naturally-occurring carbon dioxide in the atmosphere (Trudinger, *et al.* 1999). The potential for human beings to alter climate was first proposed over a century ago, building on research in the 1850s by John Tyndall. Light from the Sun warms the Earth's surface, which then gives off energy as infrared radiation, the heat you feel from asphalt on a sunny day. Greenhouse gases such as water vapor and carbon dioxide (CO₂) absorb this radiating energy, heating the atmosphere and the surface. This process results in the Earth's temperature being warmer than it would if it were heated only by direct sunlight.

For over 100 years, scientists have regarded humans as the prime suspect in current climate changes. Around the turn of the 20th century, Svante Arrhenius was the first to suggest that people could, through the burning of coal, increase the amount of greenhouse gases in the atmosphere and amplify the natural warming effect, thereby causing the atmosphere to warm more than it would through strictly natural processes. The atmospheric concentration of CO₂ has increased from a pre-industrial era (AD 1000 – 1750) concentration of approximately 280 parts per million (ppm) to around 383 ppm, as measured at Mauna Loa, Hawaii in 2007 (Forster *et al.*, 2007 and Keeling *et al.* 2008)

When humans burn gasoline, coal, natural gas, and other common fuels to make electricity or drive cars, they release a substantial amount of carbon dioxide into the atmosphere. For every gallon (or liter) of gasoline your car burns, 1300 times that volume of CO₂ is released (a gallon of gas weighs about 6 pounds or 2.8 kilograms, but the released CO₂ would weigh over 19 pounds or 8.75 kilograms). Greenhouse gases are emitted from power plants and cars, but also from landfills, from farms and cleared forests, and through other subtle processes. An interactive map from the Environmental Protection Agency shows US sources of key greenhouse gases. The World Resources Institute cataloged global sources of greenhouse gases in 2005. In the 1950s, scientists began methodically measuring global increases in carbon dioxide. Since then they've been able to confirm that the increase has been caused primarily from the burning of fossil fuels (and through other human activities, such as clearing land, as well). This increase, and changes in the type of CO₂ being added to the atmosphere provide the "smoking gun" that shows that humans are responsible for the increased levels of carbon dioxide in the atmosphere.

Industrial Revolution

The Industrial Revolution in the 19th century resulting from population has increased to an incredible extent which has engaged large-scale use of fossil fuels for industrial activities. People moved from rural areas to the cities, one continent to another. This trend is continuing even today. The rate of development as a result of industrial revolution has put more pressure on land that was covered with vegetation. The forests are cleared to make way for houses. Natural resources are being used extensively for construction, industries, transport, and consumption. Human activities result in emissions of four principal greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and the halocarbons (a group of gases containing fluorine, chlorine and bromine). These gases accumulate in the atmosphere, causing concentrations to increase with time. Significant increases in all of these gases have occurred in the industrial era. All of these increases are attributable to human activities.

The build-up of greenhouse gases in the atmosphere has led to an enhancement of the natural greenhouse effect. It is this human-induced enhancement of the greenhouse effect that is of concern because ongoing emissions of greenhouse gases have the potential to warm the planet to levels that have never been experienced in the history of human civilization. Such climate change could have far-reaching and/or unpredictable environmental, social, and economic consequences.

Human Causes

Climate change can also be caused by human activities, such as the burning of fossil fuels and the conversion of land for forestry and agriculture. Since the beginning of the Industrial Revolution, these human influences on the climate system have increased substantially. In addition to other environmental impacts, these activities change the land surface and emit various substances to the atmosphere. These in turn can influence both the amount of incoming energy and the amount of outgoing energy and can have both warming and cooling effects on the climate. The dominant product of fossil fuel combustion is carbon dioxide, a greenhouse gas. The overall effect of human activities since the Industrial Revolution has been a warming effect, driven primarily by emissions of carbon dioxide and enhanced by emissions of other greenhouse gases.

Daily activities that contribute to climate change

Our daily activities have contributed much to change in the climate. So much activities in various households which may not have been identified as climate change contributors are listed below:

1. Electricity is the main source of power in urban areas for household and commercial consumption. Until recently where solar energy emerged. Not many people can afford generating solar energy, unless otherwise an organizations or companies. All our gadgets run on electricity generated mainly from thermal power plants. Other means is through dam and the use of decayed fruits. These thermal power plants are run on fossil fuels (mostly coal) and are responsible for the emission of huge amounts of greenhouse gases and other pollutants.
2. The means of transportation of goods and people are through the means of cars, buses, train, trucks and airplane in most of our cities. These are run mainly on petrol or diesel, both fossil fuels.
3. Large quantities of waste are generated in the form of plastics, polythene bags, disposable cans, metal scraps among others that remain in the environment for many years and cause damage.
4. The use of a huge quantity of paper in our work at schools and in offices. Have we ever thought about the number of trees that we use in a day.
5. Timber is used in large quantities for construction of houses, furniture, railway tracks, which means that large areas of forest have to be cut down. This leads to deforestation and desertification.
6. A growing population has meant more and more mouths to feed. Because the land area available for agriculture is limited (and in fact, is actually shrinking as a result of ecological degradation!), high-yielding varieties of crop are being grown to increase the agricultural output from a given area of land. However, such high-yielding varieties of crops require large quantities of fertilizers; and more fertilizer means more emissions of nitrous oxide, both from the field into which it is put and the fertilizer industry that makes it. As a result of solving food shortage, other health problems emerge from the accumulation of these chemicals over the years. Pollution also results from the run-off of fertilizer into water bodies. Most aquatic animals died in the process.

The human impact on climate during this era greatly exceeds that due to known changes in natural processes, such as solar changes and volcanic eruptions.

Objective

The main objective of this study is to assess and estimate the activities that help in the reduction of climate change and its effect on people and environment in Nigeria.

The specific aim is to assess the amount of CO₂ equivalent that would be saved if simple steps/activities were taken to reduce impacts on the planet.

Methodology

Questionnaires were administered to 200 students of University of Ibadan, Nigeria. About 85 per cent questionnaires were recovered. Software developed by USEPA was used to analyze the data.

Results

The results showed that 124.29kg of CO₂ would be saved annually by individual while 9,396,436,358.08kg would be saved if all students turn off water while brushing their teeth. Also turning off light has individual annual saving of 424kg, while if all students took the action is 32,010,526,526.20kg per year. Public transportation is another activity that saved 178.72kg by individual, while if all students took the action 13,490,392,860kg would be saved annually. Turn-off television is 381.48kg by individual and 28,815,738,164.50kg for all students. An average of one (1) video game per student would save 262.18kg of CO₂ annually while all students saved 19,816,040,230.50kg annually. Unplugged chargers not in use and at least average of two (2) chargers per student saved 4.54kg of CO₂ and 335,348,373.33kg for all students. The study also confirmed that at least each student has one computer (laptop), 162.39kg would be saved by individual yearly, while 12,267,569,689.50kg would be saved annually.

Discussion

Based on these activities, 1745kg of CO₂ equivalent was avoided per year. This is equivalent to the emissions from driving a car 6602.96km. Therefore, if all students in University of Ibadan took these actions, they would save a total of 131,802,909,337kg per year. This is equivalent to the emission from driving a car 498,789,940,025km. This is equivalent to the emissions from 26,293,025 passenger vehicles. This study recommends that some activities should be reduced to save our planet.

Recommendations

Base on the results above, this study suggests that moderate actions should be taken in our daily activities. Turn-off of water when not in use should be discouraged, mass transportation should be encouraged. So also, our gadgets should be unplugged when not in use.

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