

Climate Change, Who Is Responsible?

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Abstract

The study was carried out to create awareness of the destruction we can cause to ourselves as human beings, if we continue to contribute, by our actions to the natural causes of climate change. The problem is the visible destructions all over the world due to climate change; especially when the focus is on the areas of heavy pollutions, the changes in rain pattern, making farmers vulnerable. Increase in temperatures also lead to global warming. The type of research used is descriptive and that deals with qualitative approaches. Data collection involved both primary and secondary sources. The natural causes of climate change include volcanic activity, solar output, Forest Fires, Permafrost, Sunspots, Water Vapor, Man's Best Friend. Those caused by human are burning of fossil fuels and the conversion of land from forestry to irresponsible agricultural practices. Gases emission from landfills; overpopulation; irresponsible mining; misapplication of fertilizers and other agrochemicals; meat consumption. Evidence of climate change includes change in rainfall pattern, increase in temperatures, extreme drought, change in harmattan pattern. Low production of fruits by trees in the wild; eroded arable lands; annual drying of dams that never dried in decades and also the shortening of lifespan of living things. Effects of climate change include desertification of the world's arable land, persistent droughts, locally and abroad, unprecedented damage to infrastructure due to acid rain, volcanic eruption, earth quake, coastal erosion, unpredictable farming seasons, extinction threat on the wildlife, marine life extinction, flooding of coastal cities and island nations. Human being is a facilitator of the naturally occurring climate change. Those who mine natural resource without recourse to the laws of the land they occupy, should be dealt with legally.

Keywords

Climate, Natural, Manmade, Volcanic, Pollution, Agriculture

1. Introduction

Climate is the average weather condition of a place. The change of climate can be devastating and needs serious concerns of every Thom-dick and hurry that lives and want to live longer in a good environment. Every region and its ecosystems are vulnerable to climate change effects; this is because individual organism has its own rate of adapting to the changes and to coping with environmental challenges. Some of the potential impacts include temperature increases, sea-level rise and alterations in precipitation occasions. It is possible to gain insight into the sensitivity of systems to changes in temperature, precipitation, and sea-level and coerce the range of likely responses that have potential occurrence [1]. A warming climate is expected to cause shifts in species ranges, niches, or climatic envelopes. Shifts in the distribution of forests and other plant communities are expected to be the most extreme and rapid at ecotones—the boundaries between ecosystems—especially in semi-arid areas [2] [3]. In general, in the absence of water-stress, forest ecotones are primarily controlled by temperature [4]. China in particular is expected to experience forest migration into previously unforested areas [1]. This will definitely have an impact on the lives of the inhabitants. When energy from the sun is absorbed by the objects on earth, Earth warms up. When absorbed energy is released back into space, Earth cools. Natural and artificial factors can cause changes in Earth's energy balance, some are:

- Variations in the sun's energy, in the form of radiation reaching the Earth.
- Changes in the reflection ability of the Earth's atmosphere and surface due to destruction of some of the reflective surfaces.
- Changes in the greenhouse effect, which influences the amount of heat retained by Earth's atmosphere.

Scientists have put together a record of Earth's climate, dating back hundreds of thousands of years, by analyzing a number of indirect measures of climate such as ice cores, tree rings, glacier lengths, pollen remains, and ocean sediments, and by studying changes in Earth's orbit around the sun [5].

Recent climate changes, however, cannot be explained by natural causes alone. Research indicates that natural causes do not explain most observed warming, especially warming since the mid-20th century. Rather, it is highly probable that human activities have been the dominant cause of that warming [5]. Could this view be shared among researchers around the Globe?

National Oceanic and Atmospheric Administration [6] annual greenhouse gases (GHG) Index, which tracks change in radiative forcing from GHGs over time, shows that such forcing from human-added GHGs has increased by 27.5 percent between 1990 and 2009. Increases in CO₂ (from 0.03% to about 0.04%) in the atmosphere are responsible for 80% of the increase. The contribution to radiative forcing by CH₄ and CFCs has been nearly constant or declining, respectively, in recent years. Greenhouse gases like water vapor (H₂O), carbon dioxide (CO₂), and methane (CH₄) absorb energy, slowing or preventing the loss of heat to space. In this way, GHGs act like a blanket, making Earth warmer than

it would otherwise be. This process is commonly known as the “greenhouse effect”.

Estimates of the Earth’s changing CO₂ concentration (top) and Antarctic temperature (bottom), based on analysis of ice core data extending back 800,000 years. Until the past century, natural factors caused atmospheric CO₂ concentrations to vary within a range of about 180 to 300 parts per million by volume (ppmv). Warmer periods coincide with periods of relatively high CO₂ concentrations (National Oceanic and Atmospheric Administration).

Climate change is likely to have potential impacts on coastal cities, particularly via sea level rise and through changes in the frequency and/or intensity of extreme weather events, such as storms and associated surges. The most threatened coastal urban environments are those that lie in deltas, low-lying coastal plains, islands and barrier islands, beaches, and estuaries. Direct impacts from sea level rise include inundation and displacement, coastal erosion, increased storm flooding and damage, increased salinity in estuaries and coastal aquifers, and rising coastal water tables and impeded drainage. Potential indirect impacts include changes in the distribution of bottom sediments, changes in the functions of coastal ecosystems and impacts on human activities [7].

Many adaptations to reduce vulnerability to climate change risks also reduce vulnerability to current climate variability, extremes, and hazards [8] [9]. Measures that are likely to reduce current sensitivity of climate variations in Africa also are likely to reduce the threat of adverse impacts of climate change [10]:

“Most analysts in the less-developed countries believe that the urgent need, in the face of both climate variation and potential climate change, is to identify or formulate policies which reduce recurrent vulnerability and increase resilience. Prescriptions for reducing vulnerability span drought proofing the economy, stimulating economic variation, regulating land and water uses, providing social support for dependent populations, and providing financial instruments that spread the risk of adverse consequences from individual to society and over longer periods. For the near term, development plans should ensure that livelihoods are much resilient to a wide range of perturbations” [9].

The term albedo refers to the amount of solar radiation reflected from an object or surface, often expressed as a percentage. Earth as a whole has an albedo of about 30%, meaning that 70% of the sunlight that reaches the planet is absorbed. Absorbed sunlight warms Earth’s land, water, and atmosphere. Reflectivity is also affected by aerosols. Aerosols are small particles or liquid droplets in the atmosphere that can absorb or reflect sunlight. Unlike greenhouse gases, the climate effects of aerosols vary depending on what they are made of and where they are emitted. Those aerosols that reflect sunlight, such as particles from volcanic eruptions or sulfur emissions from burning coal have a cooling effect. Those that absorb sunlight, such as black carbon (a part of soot), have a warming effect [5].

The problem is the destructions all over the world due to climate change; especially when the focus is on the areas of heavy pollutions, the changes in rain

pattern, making farmers vulnerable. Increase in temperatures also lead to global warming. Is the problem self-inflicted or naturally imposed?

This research will address, causes of climate change; impacts and evidences of climate change and how to reduce or minimise climate change. The main aim of this article is to create awareness of the destruction we can cause to ourselves as human beings, if we contribute, by our actions to the natural causes of climate change.

This piece of work therefore, helps people to employ best practices in farming, construction and to avoid incidences that can cause or bring about climate change (attitudinal change). It will also contribute to the existing body of knowledge or literature on the subject matter.

2. Methodology

The type of research used is descriptive and that deals with qualitative approaches. Data collection involved both primary and secondary sources. Secondary data were collected from related books, journals, and official documents on climate change from some countries. The primary data sources include focus-group discussions, field observation and intensive interviews with sampled farmers, who were randomly chosen, and other key source, included elders with rich experience in variable climatic conditions. A qualitative research method was selected because the method allows a researcher to explore the conditions of social practices, relationships, and ideas, and to evaluate the message from the participants' points of view [11] [12]. Qualitative methods allow researchers to discuss various manifestations of intended outcomes not reflected in standardized instruments, and to identify unintended positive or negative outcomes for the individual, an institution or the community [13]. Qualitative techniques are essential for documenting the adaptations necessary for the application of interventions in the real-life context and for identifying key intervention components and desired outcomes [12] [13].

3. Findings and Discussions

Some of the causes of climate change are natural, others are actually Man made. The following revelation is pointing in that direction.

3.1. Natural Causes

These include changes in volcanic activity, solar output, through nuclear fusion, the sun generates huge amount of energy and therefore contributes to the chunk of energy on the earth surface and the Earth's orbit around the Sun. The two factors relevant on timescales of contemporary climate change are changes in volcanic activity and changes in solar radiation [14] others include, Forest Fires; Permafrost; Sunspots; Water Vapor; Man's Best Friend. In terms of the Earth's energy balance, these factors primarily influence the amount of incoming energy. Volcanic eruptions are episodic and have relatively short-term effects on

climate. Changes in solar irradiance have contributed to climate trends over the past century but since the Industrial Revolution, the effect of additions of greenhouse gases to the atmosphere has been over 50 times that of changes in the Sun's output [14].

Forest Fires: Deforestation is one of the leading causes of global warming. Natural forest fires pose a problem for the earth's air by emitting carbon-filled smoke into the atmosphere, and new forests' growth is slow and not stable enough to produce the much-needed oxygen into the newly, suffocating carbon air. Eventually polluting gases are trapped in the atmosphere causing more harm through global warming.

Permafrost: This is a soil or rock with frozen ice for a number of years, which keeps in the carbon and methane gases, it leaks carbon into the earth's atmosphere. As long as its formation cannot stop, its earth's melting icecaps will always be a source of worry.

Sunspots: [15] proposed a theory that sunspots are forged by the sun's magnetic field. Sunspots are increasing global temperature [5]. It restricts the passing of solar plasma, which in effect gives off radiation. Radiation at some magnitude is a bad thing. They can change the energy radiating to earth's atmosphere, causing increase in climate temperature.

Water Vapor: [16], two-thirds of the gases stuck in the thick blanket is in the form of water vapor. This blanket not far away from the earth surface, prevent a successful reflection of radiation back into the atmosphere to bring about cooling on the surface of the earth. This causes rise in temperature. The water vapor is unable to escape, and thus results in hotter climate changes.

Water vapor is the most abundant greenhouse gas and also the most important in terms of its contribution to the natural greenhouse effect, despite having a short atmospheric lifetime. Some human activities can influence local water vapor levels. However, on a global scale, the concentration of water vapor is controlled by temperature, which influences overall rates of evaporation and precipitation. Therefore, the global concentration of water vapor is not substantially affected by direct human emissions as seen in the respiratory process in living things



Man's Best Friend: Our friendly, hairy, strange, and sometimes exciting pals in the animal kingdom are also to blame. While animals also breathe out carbon dioxide and methane, their small contribution is relatively minimal, human also consume non-renewable energy, which release greenhouse effect gases. Nature's animal release of carbon dioxide, although minor, is still releasing more carbon dioxide, due to large population, into the atmosphere which can influence the climate in its small way.

3.2. Human Causes

These include burning of fossil fuels and the conversion of land from forestry to

irresponsible agricultural practices. Since the beginning of the Industrial Revolution, these human influences on the climate system have increased substantially [14]. Others include landfills emissions; overpopulation; irresponsible mining; misapplication of fertilizers and other agrochemicals; meat consumption, etc. Besides, these activities change the land surface and emit various harmful emissions to the atmosphere, thus, impacting both warming and cooling effects on the climate. The overall effect of human activities has been a warming effect, driven primarily by emissions of carbon dioxide-the greenhouse gas responsible for the most warming and supported by other greenhouse gases.

The gas responsible for the most warming is carbon dioxide (CO_2), resulting from carbon and oxygen, $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ (Chemical equation of the reaction), others include methane (CH_4) resulting from chemical combination of carbon and hydrogen, $\text{C} + 2\text{H}_2 \rightarrow \text{CH}_4$ released from landfills and agriculture (especially from the digestive systems of grazing animals), nitrous oxide (N_2O), $2\text{N}_2 + \text{O}_2 \rightarrow 2\text{N}_2\text{O}$ from fertilizers, gases used for refrigeration and industrial processes, and the destruction of plants, that would otherwise store CO_2 .

Since the beginning of Industrial Revolution, the actions of human have contributed tremendously to climate change by adding CO_2 and other heat-trapping gases to the atmosphere through breathing, burning of bushes and incomplete combustions in vehicles.

Man-induced Deforestation: Deforestation is the felling of trees and plants to make way for farming, construction and for fuel. Wood and charcoal use as fuels contribute to greenhouse gases. Forestry products such as paper and lumber provide foreign currency and that is a huge motivation for deforestation.

Fossil Fuels: Vehicles of all categories release various gases into the atmosphere, when they burn their fuels. This causes global heating thus increasing the average temperature. Over 75% of the electricity worldwide is produced by burning of fossil fuels. According to conserve energy future, coal is the major fuel that is burnt to produce power and produces around 1.7 times as much carbon dioxide per unit of energy when flamed as does natural gas and 1.25 times as much as oil.

Landfills: When we throw garbage out of our houses, it is sent to the landfills. Landfills are those big chunks of garbage that stink and can be seen in so many places around the world. Most of the time the garbage is illegally burnt which releases greenhouse gases into the atmosphere, thus, polluting the atmosphere.

Overpopulation: Since carbon dioxide contributes to global warming, the increase in population of human and other living things makes the problem worse because we breathe out more carbon dioxide into the atmosphere, even though plants also breathe, they absorb some amount of carbon dioxide for photosynthesis. Man, again cuts down these plants and that leads to accumulation of more carbon dioxide which could have caused a lag in the atmosphere to trap rays with short wavelength. More people will require more transportation system, where vehicles involved could contribute to the greenhouse gases. More people, means, more accommodation, thus more construction, hence more de-

forestation.

Irresponsible Mining: Oil and coal use to generate energy for mining increase the production of the greenhouse gases, example methane, which creates a thick shield over the atmosphere like carbon dioxide, CO₂, trapping the sun's rays.

Mis-Use of Fertilizer and other Agro-Chemicals: fertilizer produces nitrous oxide (NO₂), when it absorbs into the soil. According to conserve energy future, Nitrous oxide is 300 times more dangerous than carbon dioxide. This means applications of fertilizers on our farmlands are necessary evil.

Other greenhouse gases: The most important GHGs directly emitted by humans include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and several others. The sources and recent trends of these gases are detailed below.

Carbon dioxide

Carbon dioxide is the primary greenhouse gas that is contributing to recent climate change. CO₂ is absorbed and emitted naturally as part of the carbon cycle, through plant and animal respiration, volcanic eruptions, and ocean-atmosphere exchange. Human activities, such as the burning of fossil fuels and changes in land use, release large amounts of CO₂, causing concentrations in the atmosphere to rise.

Atmospheric CO₂ concentrations have increased by more than 40% since pre-industrial times, from approximately 280 parts per million by volume (ppmv) in the 18th century to over 400 ppmv in 2015. The monthly average concentration at Mauna Loa now exceeds 400 ppmv for the first time in human history. The current CO₂ level is higher than it has been in at least 800,000 years [17].

Human activities currently releasing CO₂ into the atmosphere, worldwide, is amazing and its devastating effects are everywhere for all to see and feel.

CO₂ emissions are in excess, thus forming lag in the atmosphere and interfering with human peaceful existence through increase in temperatures leading to global warming, flooding and hunger due to poor yield in Agriculture.

Methane

Methane is produced through both natural and human activities. For example, natural wetlands, agricultural activities, and fossil fuel extraction and transport all emit CH₄.

Methane is more abundant in Earth's atmosphere now than at any time in at least the past 800,000 years. Due to human activities, CH₄ concentrations increased sharply during most of the 20th century and are now more than two-and-a-half times pre-industrial levels. In recent decades, the rate of increase has slowed considerably [18].

Nitrous oxide

Nitrous oxide is produced through natural and human activities, mainly through agricultural activities and natural biological processes. Fuel burning and some other processes also create N₂O. Concentrations of N₂O have risen approximately 20% since the start of the Industrial Revolution, with a relatively

rapid increase toward the end of the 20th century.

Overall, N₂O concentrations have increased more rapidly during the past century than at any time in the past 22,000 years [19].

3.3. Tropospheric Ozone (O₃)

O₃, which is a potent greenhouse gas has short atmospheric lifetime. Chemical reactions create ozone from emissions of nitrogen oxides, N₂O and volatile organic compounds from automobiles, power plants, and other industrial and commercial sources in the presence of sunlight. Not only does it trap heat, it (ground-level ozone) is a pollutant known for its respiratory health complications and damage to crops and ecosystems. This O₃ is present in both the upper stratosphere, where it shields the Earth from harmful levels of ultraviolet radiation, and at lower concentrations in the troposphere, where it is the main component of anthropogenic photochemical “smog” [20].

Chlorofluorocarbons (CFCs)

HCFCs, Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆), together called F-gases, which have a long atmospheric lifetime contrary to water vapor and ozone, are often used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants. Some of these emissions will negatively influence the climate, in many years to come [18].

3.4. Evidence of Climate Change

Generally, there is a change in rainfall pattern, which influences farming seasons; increase in temperatures which used to be lower; extreme drought; change in harmattan pattern. Low production of fruits by naturally grown trees in the wild; Eroded arable lands, Annual drying of Dumps that never dried in decades and also the shortening of lifespan of human and lower-class animals globally, due to excessive environmental pollution.

There is a change in rainfall pattern, which influences farming seasons; This sometimes gets farmers confused and they end up mis-calculating their usual farming periods and they either delay or farm early and the results is not always pleasant.

Increase in temperatures which used to be lower; even though the excessive rise in temperature helps in drying of food crops as not before but it also causes flooding due to sea level rise and sometimes causes displacement of settlers around coastal areas and islands.

Extreme drought causes food insecurity and early drying of the sources of water for human and animals in communities, especially our community dams. Change in harmattan pattern, there is evidence that the harmattan we experience now were not hash as today as there is evidence of increase in the frequency of extreme weather events. Low production of fruits by naturally grown trees in the wild; it is not only reduction in fruiting by the trees, also, reduction in size and quality of the fruits. Eroded arable lands, Annual drying of Dumps that never

dried in decades and also the shortening of lifespan of human globally, due to the impact of natural and manmade agent of climate change.

All these evidences directly and indirectly affect the human being and the resulting evidence is strange and self-inflicting diseases due to careless consumption of polluted water and food substances. Shifts in the geographic range's distribution of some plant and animal species, e.g., bird migration patterns which are due to food and water shortages in their places of birth.

3.5. Effects of Climate Change

Climate change influences the inhabitants of the earth in so many ways. For instance; the end of alpine skiing; desertification of the world's arable land; persistent droughts, locally and abroad; unprecedented damage to infrastructure due to acid rain, volcanic eruption, earth quake, coastal erosion, unpredictable farming seasons; the splintering of nation-states; the demise of capitalism; extinction threat on the wildlife; marine life extinction; loss of world's glacial water towers; flooding of coastal cities and island nations [21].

Our planet is already showing the pressure of deep-seated climate change, upsetting the Earth right before our eyes. The only question going forward is how the performance of this revolution influences the planet and human lifestyle as well as its influence on the institution of capitalism. Deep-seated climate change is high and erratic weather, strong floods, parched-land droughts, ultra-fierce tornadoes, super hurricanes, loss of the world's glacial water towers, dying marine life, and rising seas, which over time will force into a broken civilization with crowds of tribal groups wandering within the ambit of the planet in search of livelihood, similar to life under the emergence of Cro-Magnon (Early European modern human) 40 - 50,000 years ago [21].

Alpine Skiing: There are 2100 ski resorts worldwide, and in the United States alone snow skiing is a \$12 billion industry that employs 211,900 people [22]. A United Nations Environment Programme predicts that more than half of the ski resorts in France, Italy, Germany, Switzerland, and Austria will be forced out of business over the next few decades as the snow line rises.

Desertification: According to the World Meteorological Organization, carbon dioxide (CO₂)-induced climate change and desertification remain inextricably linked because of feedbacks between land degradation and precipitation.

As a result of climate change's impact on desertification, there are already regions of the world where environmental refugees are prevalent. The Asian Development Bank believes there may have been as many as 42 million environmental migrants over the past two years in Asia alone—a result of extreme weather events [23].

The World Preservation Foundation claims that not only is climate change accelerating the rate at which deserts are growing, but desertification itself also contributes to climate change. When previously fertile land turns to desert, carbon stored in the drying land vegetation and soil is released into the atmosphere.

The Millennium Ecosystem Assessment reports that 20% of arid regions have already become desertified, placing 2 billion people at risk of starvation, unless they become environmental migrants.

Embedded Droughts. Embedded droughts have become worldwide events these past few years and this threatens the world's food supply. For example, a slow-moving jet stream was behind a "blocking weather pattern" with a massive dome of high pressure across the U.S. that led to the remarkable March 2012 heat wave that sent temperatures in the Midwest and Northeast soaring into the 80s, as winter turned to summer overnight. Furthermore, the U.S. Dept. of Agriculture claims the ensuing 2012 drought was the worst since the 1950s.

Syria, a major part of the breadbasket of the Middle East, has suffered a series of serious droughts. From 2006-2011 up to 60% of Syria's land experienced one of the worst long-term droughts and most severe set of crop failures in the history of the Fertile Crescent [24].

Damage to Infrastructure. Munich Re, the world's largest reinsurance company, says climate change has contributed to a five-fold increase in weather-related disasters since 1980.

An extensive study conducted by DARA, headquartered in Madrid, Geneva, and Washington, D.C. and Climate Vulnerable Forum (a global partnership of 11 founding countries) concluded: "Climate change is already contributing to the deaths of nearly 400,000 people a year and costing the world more than \$1.2 trillion, wiping 1.6% annually from global GDP" [25].

Thawing permafrost, flooding and coastal erosion are the culprits behind the damage to roads, ports, public buildings, and pipelines, which are especially vulnerable.

The End of Free enterprise. According to Columnist Naomi Klein, economic activities should be controlled to minimize rapid environmental degradation. Economist should be educated not to regard the air as an open sink.

The ego of individuals serves as a blockage for development. Private enterprises do not live up to expectation and will go at length to violate rules and regulation governing their terrain of business activities. There is generally disregard of the harm that can be caused by non-renewable energy sources on the climate, example, burning of fuel. In the light of their behaviour, farming becomes difficult and respiratory diseases rise [26].

Marine Life Extinction: Chemically or thermally polluted water bodies cause harm to the aquatic life. The polluted water sometimes brings about oxygen deficit causing the organisms nutritionally and or respiratory challenges leading to death of the aquatic life. Felling of trees promotes climate change, as it causes increase in CO₂ in the atmosphere leading to temperature increase on the earth surface, thus, causing thermal pollution of the world's water bodies. Climate change poses the greatest risk for exploited species in low-income countries with a high dependence on fisheries [27].

An international team of researchers has found that approximately 90% of all marine life on Earth will be at risk of extinction by 2100 if greenhouse gas emis-

sions are not curbed. Greenhouse gas emissions impact the world's climate in two ways. They raise the temperature of the atmosphere (and by extension, Earth's surfaces and bodies of water) by holding in heat, and in the case of CO₂ emissions, they make water more acidic, like carbonated soft drinks [28].

Since the time of mechanical unrest, the seas have assimilated 30% of world-wide carbon dioxide. Lamentably, exorbitant degrees of CO₂ in the seas repress marine species from separating calcium carbonate from the water. Sea fermentation today is in any event multiple times quicker than at some other time ever, as indicated by Dr. Andy Ridgwell, University of Bristol, School of Geographical Sciences [29].

Another illustration of the fermentation problem is weakening the shells of Pteropods (a free-swimming animal, a small snail with a defensive shell) they serve as food hotspot for salmon, mackerel, herring, and cod.

As per Dr. Alex Rogers, Scientific Director of the International Program on the State of the Ocean, One World (UK) Video, August 2011: "I think in the event that we proceed on the flow direction, we are taking a gander at a mass annihilation of marine species regardless of whether just coral reef frameworks go down, which it would appear that they will surely before the century's over. That would, to me, establish a mass elimination occasion...up to 9 million species are connected just with coral reefs...a considerable lot of the manifestations that we are seeing of progress in the seas demonstrate that the impacts will be a lot more extensive than coral reef presence...rising temperatures are now changing dispersion of living beings..."

World's Glacial: A glacier is a large, perennial accumulation of crystalline ice, snow, rock, sediment, and often liquid water from land and moves down due to gravity. The World Bank claims more than 100 million individuals are in danger due to the liquefying glacial masses of the Andes, losing their water, water system for crops, and hydropower. This is occurring a lot quicker than climatologists at any point expected.

As per an article in Nature magazine, July 2012, Yao Tandong, a glaciologist at the Chinese Academy of Sciences Institute of Tibetan Research in Beijing: "intimated that most of the ice sheets have been contracting quickly across the contemplated region in the previous 30 years," since the time China found state free enterprise [30].

Moreover, as per Cheng Haining, senior specialist at Qinghai Province's Surveying and Mapping Bureau, (70%) of the ice sheets at the headwaters of the Lancang have vanished. Another examination by the region shows 80 glacial masses that give water to the Yellow River are contracting, and the Yangtze River is compromised also, all due to increasing temperatures at 50-year highs [30].

Coastal Cities and Island Nations Flooding: Nations and coastal cities are at the receiving end of the devastating anger of the "animal" called climate change. The rich in the communities pay less a price as the poor. Global warming due to natural and manmade cause of climate change sometimes leads to convectional rainfalls, where the water usually struggles to find its own level due to poor

drainage, infiltration and hydraulic conductivity. The consequence is that lives and properties are lost, some are affected socially, psychologically and mental instability. Ghana has its own share of this effect of climate change.

Here is what Dr. Richard Alley, Evan Pugh Professor of Geosciences, Penn State University vouched for the U.S. Place of Representatives, Nov. 17, 2010: that “Softening of the entirety of the world’s mountain glacial masses and little ice covers may raise ocean level by around 1 foot (0.3 m), however liquefying of the incredible ice sheets would raise ocean level by a little more than 200 feet (more than 60 m). We don’t anticipate seeing dissolving of a large portion of that ice, however even a moderately little wash in the ice bed covers could make a difference to the world’s coasts...”.

Dr. Back Street advised the individuals from Congress that human-caused environmental change may drive the Earth to cross one of its tipping focuses. At that point, what happens next is anyone’s guess! Fiasco could happen rapidly, as per Professor Stephen Pacala, Director, Princeton Environmental Institute, “There is a class of practically prompt environmental change that I call ‘beasts behind the entryway.’ They are ‘beasts’ on the grounds that were they to happen today, they would be catastrophic” [31].

It is a reasonable explanation that, if mankind keeps on heaving carbon dioxide into the air at ever-quicker rates it will spell doom on every life that dwells on the earth surface.

How to Reduce or Slow Down Climate change

Many hands and minds are to be put at work to ensure reduction of climate change, especially those that are manmade, some include; Get involved; avoid felling of trees and bad farming practices; Be conscious of energy efficiency; Choose renewable power over non-renewable; Eat wisely; Trim your waste; Let polluters pay; Fly less; Green your commute [32].

[33] had to say the following “I figured out how to stop abrupt climate change in regard to making the planet cool rapidly instead of heating up. I came to a realization that earth’s magnetosphere is decreasing because of the increase of machine made, electric grids, high magnetic used in hospitals and machines like the hydron collider! Every single thing we human make with a magnetic field will disrupt earth’s own magnetic field, if only by a little amount. The more machines that have been made over the past 30 years; the weaker the earths’ field has got. So, to stop the atmosphere from heating up we have to decrease the number of magnets we use. The earth’s magnetosphere will recover, stopping the solar radiation”.

Reducing greenhouse gas emissions will also build healthier communities, ensure positive economic turn around and jobs creation. Vote for politicians with good climate change policies should be given opportunity to rule. Develop taste for the use of renewable power, such as from wind farms. Buy organic and locally grown foods. Avoid adulterated and processed substances. Grow some of the food you eat. And do not depend so much on the food chain—at least one meat-free meal a day can contribute immensely in reduction of greenhouse gas

emission—since 18 percent of greenhouse gas emissions come from meat and dairy production [34].

Food writer, Michael Pollan sums it up best: “Eat food. Not too much. Mostly plants” Garbage buried in landfills produces methane, a potent greenhouse gas. Keep stuff out of landfills by composting kitchen scraps and garden trimmings, and recycling paper, plastic, metal and glass. Let store managers and manufacturers know, you want products with minimal or recyclable packaging. Carbon taxes make polluting activities more expensive and green solutions more affordable, allowing energy-efficient businesses and households to save money. They are one of the most effective ways to reduce world’s climate impact. If your province or country doesn’t have a carbon tax, ask your leaders to create that opportunity. Air travel leaves behind a huge carbon footprint. Before you book your next airline ticket, consider greener options such as buses or trains, or try vacationing closer to home. Video conferencing or skype for communication with people from afar, which saves time and costs of travel and accommodation, especially during pandemics, like COVID-19.

Transportation causes about 25 percent of Canada’s greenhouse gas emissions, so walk, cycle or take transit whenever you can to reduce impact of pollution, thus, climate change in your country. Money can be saved if you go car-free, carpooling or car sharing, and use the smallest, most fuel-efficient vehicle possible.

You might feel like your lifestyle is insignificant compared to oil extraction or vehicle emissions, the choices we make in our day-to-day life—how we get around, what we eat, how we live—play a major role in slowing climate change and therefore everyone is urged to tread cautiously.

4. Conclusion

Both man-made and naturally driven causes of climate change are enormous. The looming danger or threat is the devastating consequences our own behavior can bring to bear on the social, economic and the naturally supportive environment. Without the activity of Man, climate change will occur naturally, but the natural processes are only catalysed by the actions of Man. All the causes of imminent climate change are controllable but not eliminable, thus the processes leading to climate change can be slowed down. The experienced individuals’ position on drought, unpredictable pattern of rain, observable desertification, expansion of human settlement at the expense of the forest, harsher harmattan seasons and excessive loss of soil quality in terms of nutrients, texture and structure, showed that the process of climate change is not stoppable, it can only be slowed down. Therefore, human being is a facilitator of the naturally occurring climate change.

Recommendations

In putting measures to control or minimise climate change, those who pollute

the land, the water and the air should be made to pay more.

Compensate the less privilege who are affected by the problems of climate change.

Those who mined the natural resource without recourse to the laws of the land they occupied, should be dealt with, using appropriate laws of Nations.

It goes without saying that when the last three dies, the last man dies, in the light of this, whoever causes deforestation should be made to face the law like a murderer.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Preston, B.L. and Jones, R.N. (2006) Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions. A Consultancy Report for the Australian Business Roundtable on Climate Change.
- [2] Allen, C.D. and Breshears, D.D. (1998) Drought-Induced Shift of a Forest-Woodland Ecotone: Rapid Landscape Response to Climate Variation. *Proceedings of the National Academy of Sciences of the United States of America*, **95**, 14839-14842. <https://doi.org/10.1073/pnas.95.25.14839>
- [3] Foster, P. (2001) The Potential Negative Impacts of Global Climate Change on Tropical Montane Cloud Forests. *Earth-Science Reviews*, **55**, 73-106. [https://doi.org/10.1016/S0012-8252\(01\)00056-3](https://doi.org/10.1016/S0012-8252(01)00056-3)
- [4] Ohsawa, M. (1995) The Montane Cloud Forest and Its Gradational Changes in Southeast Asia. In: Hamilton, L.S., Juvik, J.O. and Scatena, F.N., Eds., *Tropical Montane Cloud Forests*, Ecological Studies, Vol. 110, Springer-Verlag, New York, 254-265. https://doi.org/10.1007/978-1-4612-2500-3_17
- [5] EPA (2017) Causes of Climate Change. https://19january2017snapshot.epa.gov/climate-change-science/causes-climate-change_.html
- [6] National Oceanic and Atmospheric Administration (NOAA) Annual GHG Index. <https://www.esrl.noaa.gov/gmd/aggi/>
- [7] Alistair, H. and Paul, W. (2007) Literature Review on Climate Change Impacts on Urban City Centres: Initial Findings.
- [8] El-Shaer, M.H., Eid, H.M., Rosenzweig, C., Iglesias, A. and Hillel, D. (1996) Agricultural Adaptation to Climate Change in Egypt. In: Smith, J., Bhatti, N., Menzhulin, G., Benioff, R., Budyko, M.I., Campos, M., Jallow, B. and Rijsberman, F., Eds., *Adapting to Climate Change: An International Perspective*, Springer-Verlag, New York, 109-127. https://doi.org/10.1007/978-1-4613-8471-7_11
- [9] Rayner, S. and Malone, E.L. (1998) Human Choice and Climate Change Volume 3: The Tools for Policy Analysis. Battelle Press, Columbus, 429 p.
- [10] Ominde, S.H. and Juma, C. (1991) Stemming the Tide: An Action Agenda. In: Ominde, S.H. and Juma, C., Eds., *A Change in the Weather: African Perspectives on Climate Change*, ACTS Press, Nairobi, 125-153.
- [11] Lietz, C.A. and Zayas, L.E. (2010) Evaluating Qualitative Research for Social Work Practitioners. *Advances in Social Work*, **11**, Article ID: 188202.

- <http://journals.iupui.edu/index.php/advances>
<https://doi.org/10.18060/589>
- [12] Salifu, A. and Mohammed, H. (2018) The Effect of the Activity of Man on the Environment and Science Education. *ADRRJ Journal (Multidisciplinary)*, **27**, 13-27.
- [13] Leech, N.L. and Onwuegbuzie, A.J. (2007) An Array of Qualitative Analysis Tools: A Call for Data Analysis Triangulation. *School Psychology Quarterly*, **22**, 557-585.
<https://doi.org/10.1037/1045-3830.22.4.557>
- [14] Government of Canada (2015) Causes of Climate Change.
<https://www.canada.ca/en/environment-climate-change/services/climate-change/causes.html>
- [15] Babcock, H.W. (1961) The Topology of the Sun's Magnetic Field and the 22-Year Cycle. *The Astrophysical Journal*, **133**, 572-587. <https://doi.org/10.1086/147060>
- [16] Volcanic Gases Can Be Harmful to Health, Vegetation and Infrastructure.
<http://volcanoes.usgs.gov/hazards/gas/index.php>
- [17] Natural and Man-Made Causes of Global Warming.
<https://www.conserve-energy-future.com/globalwarmingcauses.php>
- [18] Climate Change. <http://www.epa.gov/climatechange/science/causes.html>
- [19] Climate Change Science.
https://19january2017snapshot.epa.gov/climate-change-science/causes-climate-change_.html#ref2
- [20] Gillenwater, M. (2010) What Are Greenhouse Gases? GHG Management Institute, Rome.
- [21] Robert, H. (2013) Top Ten Dreadful Effects of Climate Change.
<https://dissentvoice.org/2013/04/top-ten-dreadful-effects-of-climate-change/>
- [22] Joanna, M.F. (2012) Warming Sky Slopes Shrivelled Revenue. *New York Times*.
- [23] Tiermey, S. (2012) Climate Change, Desertification and Migration. Connecting the Dots. RTCC (Responding to Climate Change).
- [24] Tim, L. (2012) The Driest Season: Global Drought Causes Major Worries. *CNN*.
- [25] Fiona, H. (2012) Climate Change Is Already Damaging Global Economy.
- [26] Bill, M. (2012) Capitalism and Climate Change. Moyer and Company, Franklin.
- [27] Boyce, D.G., Tittensor, D.P., Garilao, C., Kaschner, K., Kesner-Reyes, K., Pigot, A., Reyes Jr., R.B., Reygondeau, G., Schleit, K.E., Shackell, N.L., Sorongon-Yap, P. and Worm, B. (2022) A Climate Risk Index for Marine Life. *Nature Climate Change*, **12**, 854-862. <https://doi.org/10.1038/s41558-022-01437-y>
- [28] Bob, Y. (2022) Study Shows 90% of Marine Species at Risk of Extinction by 2100 If Greenhouse Gas Emissions Are Not Curbed.
- [29] Zimmer, C. (2010) An Ominous Warning or the Effect of Ocean Acidification. *Environment* 360, Yale University, New Haven.
- [30] Staff Writers (2011) Glaciers in China Shrinking with Warming. *Beijing (UPI): Ice World*.
https://www.spacedaily.com/reports/Glaciers_in_China_shrinking_with_warming_999.html
- [31] Brokaw, T. (2006) Documentary on Climate Change, Global Warming. *Discovery Channel*.
- [32] David Suzunki Foundation (2017) Top 10 Ways You Can Stop Climate Change.
<https://davidssuzunki.org/what-you-can-do/top-10-ways-can-stop-climate-change/>

- [33] Kelly, F. (2018) How Can We Prevent Climate Change.
<http://www.preventclimatechange.co.uk/prevent-climate-change.html>
- [34] Intergovernmental Panel on Climate Change (2007) Climate Change 2007: Synthesis Report. Summary for Policy Makers.