The Ethical Paradoxes in Global Warming and its Mitigation Strategies

Ibe Eunice Chinweikpe

Major research paper submitted to the Faculty of Human Sciences and Philosophy, School of Ethics, Social Justice and Public Service, Saint Paul University, in partial fulfilment of the requirements for the degree of Master of Arts in Public Ethics

Ottawa, Canada, January 2023

Abstract

This study titled, "The Ethical Paradoxes in Global Warming and its Mitigation Strategies", places emphasis on the ethical issues emerging from global warming and particularly the implications of mitigation and adaptation on the least advantaged worldwide. Global warming is basically attributable to the surge in burning of fossil fuels in both the developed nations and developing nations and is the main reason behind the destruction of the Earth's climate. This study observes that adverse climatic effects developing from this phenomenon are presently faced mostly by the least developed countries. This study uses Garrett Hardin's remarkable thesis *The Tragedy of the Commons* as its theoretical framework. Hardin identified that people tend to excessively use a commonly owned resource which ends up in its eventual ruin. In this research, the global climate is the *commons* under the risk of destruction by global warming. The ethical ground on which this study will take its roots is in the theory of consequentialism, which can be traced back to the views of Jeremy Bentham and John Stuart Mill but, for the purpose of this study, I am going to dwell on the theory of consequentialism as espoused by Steven Gardiner, in his book titled *A Perfect Moral Storm*. This study aims at projecting the consequences of mankind's actions on the present and future generations with regards to global warming and its mitigation strategies, since consequentialism is an ethical theory that dwells on the consequences of our actions, rules or practices. Seeing that global warming is greatly influenced by the actions of humans, I think it is the best standard ethical theory for this study.

Section One

1.0. GENERAL INTRODUCTION

1.0.1. *Background to the Research.* In recent times, it is commonly acknowledged that global warming is one of the major environmental problems challenging to humanity. Since the emergence of the 21st century, climatic modifications have produced the environmental catastrophe facing mankind. There is a developing empirical attestation that the earth's climate is changing for the worse and mankind must be concerned with the stemming adverse outcome (Bjornberg and Hansson 671). These outcomes are not only detrimental to developing countries across the world but will potentially mar future generations as well. This is in part because of the advancing human population and the neglect for environmental preservation.

Following the Industrial Revolution, in sequence with an advancing population, in a globe with restricted resources, mankind has made noteworthy technological and economic headway. This implies that natural resources are being capitalized for the aim of elevating living standards. The hunt for economic growth has enriched living standards and provide more material goods and services for most persons, thereby, elevating economic inheritance for the least advantaged in some nations (Earth Science). Although, this may not always be the case. Nonetheless, in addendum to economic growth, is the affinity of each person to chase his own concern.

Economic progression in this situation is adding to heightened personal freedom – most persons acting as they delight without regards for others. This brings about some ethical dilemmas where humans utilize natural resources to the extent of ruining the environment, and possibly causing harm to future generations and the end product of this is the adverse climatic effects being experienced currently arising from the destruction of commonly owned resources corresponding to the increase and misuse of the communal farm in Garrett Hardin's thesis, *The Tragedy of the Commons* (Goudie 249) & (Larkin 209).

Garrett Hardin, the author of *The Tragedy of the Commons,* whose article is relevant to this research, wrote and emphasized on the demand for regulating population growth, limitation on American immigration and endorsed birth control, as well as advocated for abortion. He hypothesized that famine, wars, and genocide could be analyzed from a viewpoint of structural change as a natural means of population control. His critical paper, *The Tragedy of the Commons,* first printed in 1968, cited the issue of world's over-population and the corollary environmental degradation as its two fundamental themes. Using these fundamental themes, this research probes the ethical problems human generations offer and the future that will be faced with grappling global warming, climate change and its mitigation. That is, choosing between industrialization and economic advancement, and the increase in global warming due to the aforementioned activities.

In this research, climate change appertains to the persistent changes in weather factors such as precipitation, humidity, winds, and cloudiness (Earth Science). These elements change in numbers from time to time, thereby causing climate change. Albeit, of all numbers, temperature changes are the highest influenced by human-derived industrial actions (Dessler and Parson 47). Temperatures are rising due to air pollution and the number of pollutants that are released into the atmosphere, causing global warming. These pollutants are Greenhouse gas effluence. By atmosphere, we imply the global *commons*. All resources in the possession of man in commons, such as oceans, air, and the rest (McCay and Acheson xii).

In respect to global warming, the aftermath negative consequences include rising air and ocean temperatures, melting of glaciers and ice, biodiversity loss, rising sea levels, desertification, global food availability, water scarcity, waste and energy insecurity, resource depletion (Becker and Brown 38). The commons are endangered (McCay and Acheson xvi) &

(Hardin 1243). Amidst global temperature levels ascending and climatic variations occurring on the other hand, intense weather conditions are now global with people being faced with many weather-affiliated problems (Gupta 2). This is expected given the unconcerned attitude of many displayed towards global climate in the pursuit for economic progress and industrialization. This attestation of climate change has led to the proffering of several solutions such as government interposition, to desperate ones including privatization of certain commons (McCay and Acheson 1).

Currently, those who have given and tendered the lowest to carbon emissions in the past, for instance, Tuvalu in Oceania and Niue in New Zealand, India in Asia, are mostly going to bear the adverse effects of global warming (ClientEarth). This has ethical implications because wealthy nations bolster elevated economic growth and technology by industrialization, thereby, emitting the most greenhouse gases. This is a condition in which global climate, like the "Hardinian communal farm", has been contaminated by the carbon emissions to the point of destruction. Mitigation of global warming and its adverse effects airs an ethical problem on the well-being of citizens of developed nations, developing nations and people to live in future, and the economic gains that are accrued from industrialization.

1.0.1. *Definition of Terms*. Climate refers to the usual pattern or general weather conditions of a specific place over a period, up to two or three decades. Climate Change involves the changes in variations in atmospheric factors such as rainfall, temperature, and wind patterns. In this study, climate change is widely traceable to changes in temperature degrees which are on the increase owing to global warming. Chlorofluorocarbons (CFCs) are regarded as passive gases previously produced in the 1930s and applied as industrial coolants; electronic cleaning solvents, furthermore, to being oxidizers for spray cans and, in the produce of foams. Commons: they are

regarded as all the resources possessed in common such as grasslands, air, fish, oceans (Hardin 1243-4). Clean Development Mechanism is a policy in the *Kyoto Protocol* designed to assist groups in the treaty in fulfilling sustainable development as well as subscribe to emissions' reductions and limitations. Paradoxes are regarded as a type of social dilemma whether to decrease misappropriation of resources, consumption and, possibly, personal well-being for the future of a party or continue at the same frequency, hazarding the 'common pool' (1243-4). Greenhouse Gases (GHGs) are regarded as gases such as: nitrogen oxide, carbon dioxide and methane, that somewhat absorb and re-discharge outgoing lengthy wave of infrared terrestrial radiation from the planet's surface. In this study, carbon emissions and GHGs are used vice-versa to express similar emissions. Greenhouse effect is regarded as the obstruction of solar radiation retreating into space by gases such as carbon dioxide and water vapor in the atmosphere. Such gases develop a covering over the Earth's atmosphere, thus, expanding its overall temperature. Global Warming is regarded as a rise in the Earth's normal atmospheric temperature causing reciprocal changes in climate that may spring up from the greenhouse effect. O.E.C.D is regarded as the Organization for Economic Co-operation and Development, which is a body of thirty-four nation-states granting governments with a colloquy for comprehending environmental, economic, and social matters. Mitigation is regarded as the action of reducing severity of something, in this case, it is regarded as blueprints taken to fight climate change such as decrement of greenhouse gas emissions.

1.0.2 *Statement of the Problem.* Many persons in recent times are dying from the adverse effects of climate change such as floods and changes in rainfall patterns, recurrent droughts, and so forth (Earth Science). Some more, yet to be born, will be affected from these adverse effects of global warming (ClientEarth). This aim of this study is to critically appraise the ethical dilemmas

brought about by global warming and to examine whether the advanced and wealthy nation-states are carrying out injustice on the poorest humanity, especially, those who add little or nothing to global warming. The problem under this study is that of human populace rising by the day, over-capitalizing fossil fuels and bringing about chunks of carbon emissions into the atmosphere to the magnitude that adverse climatic effects have emanated. These adverse effects are in turn harming the defenseless (i.e., developing nations that do not have the resources to fight global warming) currently and have the possibility of hurting future generations. Our global climate, as our "commons," is being ravaged to a great extent by industrialization and the burning of fossil fuels, which is why the goal should be for economic advancement and industrialization without the burning of fossil fuels.

However, this study analyzes the ethical problems ascribable to the reality and problems generating from mitigating global warming at the detriment of the present and/or future living standards. This implies numerous issues such as: doing away with the use of fossil fuels liable for global warming, decline in goods consumption, specifically, those accountable for environmental degradation in industrial sectors. The outcomes of such sacrifices are advantageous for future generations who will have an enhanced environment and culture. This albeit implies a level of distress for the present generation. This is the ethical trade-off of striking a balance between the urgency to mitigate global warming while procrastinating socio-economic advancement currently or forging industrialization for improved living standards for the present and future generations to arrive, not minding its effect on global climate.

1.0.3 *Theses Statement.* This study aspires to critically appraise the ethical dilemmas advanced by global warming and its mitigation on human population, by examining whether or not advanced and wealthy nation-states are carrying out injustice on the poorest humanity while also

analyzing the ethical dilemmas ascribable to the reality and problems generating from mitigating global warming at the detriment of the present and/or future living standards.

1.0.4. *Ethical Theory*. The ethical ground on which this study will take its roots in the theory of consequentialism as espoused by Steven Gardiner, in his book titled *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*. This study aims at projecting the consequences of mankind's actions on the present and future generations with regards to global warming and its mitigation strategies since consequentialism is an ethical theory that dwells on the consequences of our actions, rules, or practices. Seeing that global warming is greatly influenced by the actions of humans, I think it is the best standard ethical theory for this study.

1.0.5. *Research Objective*. This study seeks to delve into the phenomenon of global warming and the ethical dilemmas it airs on present and future generations. It also attempts to address the ethical issues concerning environmental ethics study in Public Ethics with concern to the discourse on Climate Change and Global Warming, as this study identifies the interdisciplinary nature of the global warming discourse as not just scientific but ethical, one that would add to the current literatures in Public Ethics.

1.0.6. *Theoretical Framework*. Having identified that global warming and its outcomes have advanced in immense part from man's respective and collaborative actions of resource capitalization, the theoretical framework piloting this study is Garret Hardin's *The Tragedy of the Commons.* Hardin asserts that man's behavior concerning the commons, (as regards this research, the global climate), ends in consequent recession and destruction. Mankind, presently, is engrossed with the chase of industrialization to advance living standards, not minding the effect this has on the environment and by addendum, global climate. Hardin remarks:

> Each man is locked into a system that compels him to increase his herd without limit (*regarding this research, industrialization using fossil fuels* – italics is mine)—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedoms in a commons brings ruin to all (1244).

The pivot point of Hardin's study is that majority of persons gear towards over-exploiting a commonly owned resource which eventually ends up in destruction. The global climate, which is owned in common, is changing, presenting an ethical dilemma on present generations in rectifying its impact now and for the future. This is because, it has been scientifically proven that the capitalization and over-utilization of fossil fuels among other resources is one of the major causes of global warming (ClientEarth). Notwithstanding, from the quotation above, Hardin's assertion was formerly made bearing in mind the issue of human population growth. It is currently generally accepted as a broad-brush theoretical framework to elucidate disparate cases of resources over-capitalization as will be applied in this research. Using this framework, this research will propose a quick fix of what humanity ought to do to save global climate from further devastation for the sake of all generations.

1.0.7. *Research Methodology*. This study will mainly be a theoretical analysis in which diverse texts, such as, *The Greenhouse Effect,* authored by Stewart Boyle and John Ardill in1989, *The Science and Politics of Global Climate Change: A Guide to the Debate,* authored by Dessler Andrew and Edward Parson in 2006, *The Human Impact on the Natural Environment,* authored by Goudie Andrew in 1987, The *Paris Agreement* in 2015, and other texts, will be researched. We shall use and utilize three philosophical approaches, they are, critical, logical and ethical analysis. Critical analysis is utilized in the analysis of global warming and its mitigation strategies and their significance on now and future generations.

We will make use of several literature texts in critically exploring these strategies and offering answers to austere farther desolation of global climate.

Logical analysis, conversely, will be used and utilized in identifying the paradox and flaws in the debate for and against the mitigation of global warming for mankind today and those to arrive. Lastly, we will implore the use of ethical analysis to provide right moral background as regards our consumption of fossil fuels. Since this study is of a tangible environmental concern, we will hope to put together contributions and recommendations at the end of the study that will spring up from critical and logical analysis of the phenomenon and its mitigation strategies.

Section Two

2.0. THE SCIENCE OF GLOBAL WARMING

Regarding this section, we seek to answer these pertinent questions as follows: is climate really changing? And if that be the case, how is it changing? Furthermore, we will analyze the philosophical status of global warming after comprehending the answers to the pertinent questions aforementioned in this section. As a result, we will be able to analyze the ethical concerns facing humanity as regards mitigating its effect. This is achievable through the viewpoint of Hardin's theory, in line with the occurring climatic disputes being experienced. Most recently, not over a decade, several regions of the globe have experienced and are still experiencing adverse climatic consequences. This, to a large extent, is traceable to the phenomenon of global warming characterizing the strain on limited resources worldwide. These adverse effects are thought to be the result of the excessive over-use of limited resources, in succession, giving rise to depletion of global climate; a 'tragedy of the commons' for all, as seen in Hardin's theory (Hardin 1244).

The ethical dilemma we encounter in recent times, one that concerns the least advantaged dying as an outcome of negative climatic effects, regardless of not polluting the atmosphere with carbon emissions as the developed nations do, is supposed to be partly settled by sustainable development and a decrease in the unending drive and number of inhabitants. Albeit, except we have a good understanding of the phenomenon of global warming, we will not have the needed ability to critically analyze the moral dilemmas mankind is faced with in recent times, not neglecting what will most likely happen to the future generations to come. Nonetheless, it is noteworthy for me to deliberate on this

phenomenon if we are to consider our actions, duties and responsibilities as regards sustaining global climate for both the present and future generations.

2.1. WEATHER AND CLIMATE

Methodologically, weather implies the present state of the atmosphere, at instant, or occurring right now, be it windy, cloudy, or rainy, or conditions and so on. Weather is regarded as what meteorologists do every other day in media briefings (Boyle and Ardill 7). The basis in which this is crucial to this research is because weather trends in a particular place over time account for the concept of climate. Climate as we have observed implies the general weather trends and patterns in any place over time and this is regarded as climate change (WBG). These trends and patterns are of alterations in atmospheric elements such as "wind direction and strength, temperature, precipitation, humidity" (WBG). At the point where these trends switch over time, it is regarded as climate change. Weather records over time trace changes in, for instance, rainfall, and/or temperature, their oscillations, notifying scientists and mankind on whether a particular place is getting cooler, warmer, wetter, winder, or even colder (Boyle and Ardill 7). Having well-established what weather and climate implies, we can spin our focus to the connected concepts of climate change, global warming and the greenhouse effect.

2.2 GLOBAL WARMING AND THE GREENHOUSE EFFECT

Methodologically, the Earth is heated up by incoming radiation from the sun and cooled by the emission of part of this radiation back into space. Generally, the Earth takes in 70% of solar radiation to heat up the Earth's surface, reflecting and reemitting the 30% left back into space (Earth Science). This is to say that the Earth does not take in all the sun's radiation. To maintain the Earth's temperature and keep it constant, incoming, and outgoing solar radiation must be stabilized or else the temperature would fluctuate between exceedingly heated

temperatures to extremely cold ones. This implies that under excellent conditions, our global climate has the potentiality to sustain human life satisfactorily, lacking pollution and GHG emissions (Dessler and Parson 7-9). At this point, mankind is expanding the atmospheric absorptions of greenhouse gases by means of industrialization and other environmentally hostile actions such as substandard waste disposal mechanism. The quantity of carbon dioxide and water vapor are on the increase, and so are the greenhouse gases such as nitrous oxide, synthetic chemicals and methane, known as chlorofluorocarbons. The last-mentioned three are on the increase as a result of human activities such as biomass, rice cultivation, landfills, burning, agricultural and industrial activities (9). Using the viewpoint of Hardin's theory, I propose that the increase in usage of these fossil fuels for and in industrialization, in addition to an expanding global population, have led to the ruin of global climate common to every human. Methodologically, howbeit, global warming presently narrates the dramatic growth in yearly average global surface temperature of the earth, ranging from 1.5 degrees Celsius to 4 degrees Celsius over the past few years (Drake 1) and this hypothesis can be best grasped by looking into climate science.

2.3. CLIMATIC CHANGES

The global atmosphere is greatly made up of Nitrogen at 78% and oxygen account for about 21%. The atmosphere holds out a height of about 1000 kilometers beyond the Earth's surface and is methodologically parted into four zones: the thermosphere, troposphere, stratosphere and mesosphere. Atmospheric gases are distilled into the troposphere expanding up to 17 kilometers in addition to air temperature falling gradually from 15^0 C at sea level to about -53^0 C at the tropopause. The stratosphere on another hand expands up to 50 kilometers surpassing the Earth surface and unlike in the mesosphere, troposphere and thermosphere temperature

transposition happens again, decreasing to about 90^0C then increasing to 1200^0C in both zones accordingly (Boyle and Ardill 14).

The global warming description is incomplete without us calling attention to the role the atmosphere carries out on Earth. Firstly, the atmosphere ensures that the Earth is warm, and it also promotes frequent chemical exchange of chemical elements and compounds between soils, living matter and seas on earth. Finally, it causes Earth's weather. Having stated both gases in the atmosphere, we additionally have water vapor with fluctuating degrees of about 3%, aerosols, fine dust particles and many other trace gases. Water vapor and carbon dioxide as we shall note are the dominant of greenhouse gases in respect to climate change. These gases allow solar radiation, catch part of it to heat up the earth surface (Dessler and Parson 9).

One trace gas significant to identify is Ozone, a sort of oxygen with three atoms rather than two in each molecule. This gas absorbs a great part of the sun's ultraviolet radiation and is in the atmosphere with a great deal of it distilled in the stratosphere between 20km and 50km surpassing the Earth surface. Ozone is not only spontaneous but is also produced industrially as a refining agent. In the atmosphere, the reaction of ingesting ultraviolet radiation, broken down into unbound oxygen and ozone heats up the stratospheric air. Besides the Earth surface, Ozone is formed when hydrocarbons and oxides from cars and alternative sources react with solar radiation. The outcome of this is not only atmospheric heating up but also smog which is threatening to plant and human health (Strom 96).

Climate education is incomplete without reference to global temperature changes, carbon cycle, feedbacks and, not leaving out, radiative force. The carbon cycle implies the motion of carbon in its many formations within the atmosphere, rocks, and oceans. The ocean

carries the highest number of carbon while on land, plants are responsible for about 500 billion tons, considering that photosynthesis by plants transform CO_2 to make roots, leaves, wood. In a nutshell, the carbon cycle is significantly afflicted by the distribution, kinds of vegetation, as well as human activity on land use which influences carbon in the soil and biosphere (Drake 32). It is also noteworthy that, land-use changes, specifically deforestation and agriculture, have not only affected the carbon cycle but also led to a rise in global warming (Stern 1). Sedimentary rocks, on the other hand, bear billions of metric tons of carbon put away over geologic time but can be let out into the atmosphere through cement manufacture using carbonate rocks (Strom 14). Over the past 10000 years, atmospheric CO_2 has been at a steady degree until the 19th century as about the time the industrial revolution accelerated. Like the farmers in Hardin's communal farm, industrialization via the usage and excessive utilization of fossil fuels have given increase to more greenhouse gases ruining the global climate. The outcome has been a step-by-step increase of carbon dioxide by up to 35% gotten from anthropocentric greenhouse gas emissions (14). This global warming in my view is supposed to be decelerated to save our 'commons', i.e., global climate.

2.4 ANTHROPOGENIC IMPACTS ON GLOBAL WARMING

There is a general scientific consensus that human activities are putting global warming on the increase (ClientEarth). These activities incorporate land-use changes, electricity generation, transport and agriculture. As a matter of fact, energy production supplies 61% of greenhouse gas emissions, agriculture 14%, land-use changes 18%. Sum these to the rising addition from halocarbons. Carbon dioxide is the greatest donor to global warming, the mass of it gotten from the burning of fossil fuels such as oil and natural gas, coal and cement production giving off a combined number of approximately 25 billion metric tons of global carbon dioxide

emissions annually (Strom 11). These anthropogenic activities in this research, reinforce Hardin's viewpoint on over-utilization of a global common leading to global warming. Land-use changes, especially deforestation, gives up to 20% of yearly carbon dioxide emissions presently. This is basically via the demolition of at least 73000 kilometers square of forests annually, biomass burning giving off up to 12.2 billion tons of CO_2. In accordance with scientist Robert Strom, global greenhouse emissions have not only increased dramatically in the past two hundred years but, there is also proof of the admixture of manmade chemicals into the atmosphere, some of which are twenty-two thousand times more potent than carbon dioxide (97). The rise in global carbon dioxide emissions and other greenhouse emissions is associated with industrialization and economic growth, and population growth. Mankind, presently, is presented with ethical dilemmas of not only managing and isolating carbon and greenhouse gas emissions at the price of diminished economic advancement for the present generation but also the risk of endangering future generations should we carry on in this business-as-usual approach.

2.5. THE EPISTEMIC STATUS OF GLOBAL WARMING SCIENCE

It is crucial to understand that scientific knowledge is demonstrated knowledge based upon significant data and, is objective and based on facts. These facts and significant data are tried for similarities and peculiarities over time prior to when a credible theory is formulated (Chalmers 1). Climate scientists lately have put down detailed reports and articles in journals with a few accepting a scientific groundwork of human-induced climate change. As a matter of fact, reports by groups like the Intergovernmental Panel on Climate Change (IPCC) are made available after reviewing climate science articles by over a thousand scientist (IPCC). Formation of groups such as World Commission on Environment and Development, and The

Climate Action Network, among others, give regard to the fact of general accord by scientists with concern for global warming and climate change.

The disposition of this study is that current climate science research and theories are controlled by a single paradigm. In line with philosopher Thomas Kuhn, a paradigm or a disciplinary model lays down the standards for authorized work within the science it governs by organizing and directing activities of normal scientists working within it (Kuhn 24). When we study global warming science, this view by Kuhn is unarguable. Furthermore, he asserted that paradigms incorporate standard procedures of putting in fundamental laws to a variety of kinds of situations. Paradigms even in climate science are made up of explicitly stated laws and theoretical assumptions guiding the study (Chalmers 86-7).

In the period of the global-warming paradigm, unpredictability remains; skeptics speculate that climate change and global warming are myths or practical joke (Cook and John). This does not take away the fact that global climate is dynamic, and human related activities are the largest contributors to greenhouse gases causing global warming. Until the irregularities within this global warming paradigm are addressed, it is safe to propose that it will take a while for a rival paradigm to surface. Science should nonetheless have a means of leaving an archaic paradigm for a better one as it relates to global warming discourse and mitigation.

2.6. CONSEQUENTIALISM AND CLIMATE CHANGE

Climate change is the most obstinate environmental issue. Steven Gardiner in recent past proposed an unfaltering test for moral theories. When an ethical theory does not recognize that failure to address a pressing, tractable, and anthropogenic global threat is a weighty criticism of it, he says, then that ethical theory is “inadequate and must be rejected” (Gardiner

218). This will cause us to wonder what moral theory could possibly fall in this category. It is, after all, a distasteful low hurdle. To be regarded as a standard ethical theory, a theory may not need to successfully address the global threat: it must acknowledge that failing to successfully address it is tragic. This somehow throws us into a dilemma: how could a serious ethical theory both recognize that something is a significant ethical problem, and then admit that doing nothing about it is just okay? Following the thoughts of some ethicists, though, this is just what act-consequentialism could assert in response to anthropogenic climate change. They are of the impression that even if widespread, voluntary reductions in emitting carbons are both necessary and sufficient to circumvent a climate disaster. However, act-consequentialism will propose against making them in the first place. Their initial point is that, in consequentialist views, climate change caused by humans should be, as much as possible, evaded: the world we live in now, if nothing is done to diminish climate change, it will result to too many problems compared to the world we could bring about by making a choice to emit less carbon into the atmosphere. After characterizing the issue of climate change as a 'tragedy of the commons,' Baylor Johnson asks if taking unilateral, individual steps to reduce emissions is morally required. His response:

> The only reason to adopt unilateral restraint is to avert a T of C (tragedy of the commons). So, if unilateral restraint cannot reasonably be expected to achieve its purpose, there is no reason, and hence no moral reason to adopt it… I claim that averting a T of C is the only reason for adopting unilateral restraint because in a T of C there is nothing wrong with any one person's use of the commons. No one person's use is large enough to harm the commons. Harm results only from the aggregate level of use (Johnson 277).

Act-consequentialists will be glad if it is pointed that the views of those ethicists are wrong: as it is proven in what follows, embracing act-consequentialism should not be a

basis for complacency nor a sense of righteousness, with respect to our individual emissions. Quite the contrary, it implies that individuals, as well as nations, should be making immediate and significant reductions in the emission of greenhouse gases. This implies that act-consequentialism does not fail the Gardiner's test.

Section Three

3.0. GLOBAL WARMING AND MITIGATION STRATEGIES

In this section, we will assess possible responsibilities humanity presently has to future generations and if these responsibilities are tenable. Supposing we look at past generations, do we have a legitimate reason to question if their activities and policies influenced the present demolition of global climate and whether action or inaction in diminishing global warming will influence future generations? We have good reasons to question if their activities and policies influenced the present demolition of global climate and whether our actions or inactions in diminishing global warming presently will influence generations in future. Scientific study asserts the fact that those who mostly influence global carbon emissions and those who bear unfavorable climatic effects are spread out across the globe, but the majority of those who bear the adverse effects are in developing nations (Patz, Campbell-Lendrum and Holloway 310-17). In the current state, most of the carbons produced and discharged presently are from the North (rich nations) in contrast with the fact that most of the climate related dying are in the poorer nations in the South (310-17). This albeit does not nullify the fact that global warming must be reduced for the purpose of the present and future generations. We must be conscious of the insufficiency of global climate to assure quality living except if carbon emissions are slashed.

3.1. MITIGATION OF GLOBAL WARMING

Mitigation of the consequences of global warming alludes to the strategies employed to fight it, such as depletion of greenhouse gas and carbon dioxide emissions. The aim of this is to make certain that climate change will most likely not be the case (Dessler and Parson 185). Mitigation is one of the three answers in relation to dealing with global climate change, with

the other two being prevention and adaptation. The research is, however, paying particular attention to climate change mitigation.

As stated by Dale Jamieson, mitigation by lessening greenhouse gas emissions is of great significance on two grounds. Firstly, it slows down the frequency of climate change giving allowance to humans and the environment to have more time to adapt and lessen damaging consequences of climate change. This supposition does not mean that lessening greenhouse gas emissions is like slowing down climate change (Jamieson 271). This implies that more efforts targeted at reducing global warming are needed. Secondly, the reason why mitigation is of great value is that it distributes responsibilities to several players in global climate phenomenon, at least, to the expanse of their actions. Conceivably, this implies distribution of per capita emission rights as well as per capita mitigation goals especially of inhabitants of the highest carbon emitting nations. At this point, we can ascertain the formulation of policies aimed at redressing the fatalistic effects of global warming like cutting down on an increase in a farm with limited lushness. Morally, we should have in mind that those who bear the most from carbon emissions are the least proficient in mitigating it. To drive home this point, a country like Nigeria and India have not so many resources on ground to combat the aftermath of carbon emissions. You would find them struggling with the control of the adverse effects of carbon emissions, unlike nations like the UK and US, that have resources on ground to at least control the effects of burning of fossil fuels to a large extent. Climate change mitigation attempts are affected by factors, among them are economic growth, population growth and technology employed by humanity. It crucial to note that the preceding factors are reliant on each other with instance, world GDP per person increasing up to 2% person on average and technologically lessened emissions of CO_2 by about 5%. These

collaborative factors have additively led to an increase of about 1% of CO_2 per year and this increase must be cut down (Dessler and Parson 101).

3.2. GLOBAL WARMING MITIGATION STRATEGIES

There are a few recommended ways and policies for lessening carbon emissions; howbeit, for the aim of this study, the focal point will be on technology as used in the production of energy and other carbon isolated techniques. Amidst the domain of technological changes imperative for lessening of greenhouse gases is expanding the efficiency of energy use (Dessler and Parson 102). Herewith, we imply that, starting from individuals to institutions and even economies, both at national and regional levels, the prerequisite for agents is to be proficient in the production and consumption of goods and services produced by diverse modes of energy-use. It must be acknowledged herein that measuring the efficiency of energy-use by the above-stated diverse agents is not simply quantifiable to contemplate significant change on the global scale yet. Nonetheless, this should be in tandem with a switch in economic policies and industrialization technologies, together with modifications in demographics to prevent global climate from further ruination. Fossil fuels, which have been considered to have largely contributed to rising greenhouse gas emissions, can also be used more dexterously. This is mainly so because mankind thus far cannot change from fossil fuels to carbon free energy sources in a blink of an eye. In inclusion to this is the knowledge that fossil fuels are used for ninety percent of commercial energy in many advanced economies (Boyle and Ardill 208). An automobile's efficiency can be technically upgraded. For instance, measures to consider include weight reduction, engine and transmission efficiency upgrades. The motive here will be to double the fuel efficiency of vehicles, with major car manufacturers having models with fuel efficiencies in the scale of 80 to 100 miles per gallon

(Boyle and Ardill 211). Advancing and upgrading non-fossil fuel primary energy sources is one way of mitigating global warming. Other sources include wind power, solar power, geo-thermal and hydro-electric power, biomass, as well as nuclear fission and fusion. Solar power can be utilized using solar panels and other flat plate collectors which transmutes the sun's energy into heat energy and light energy. The heat energy can then be used to warm up water and air in buildings.

In accordance with United Nations Environment Program – UNEP, in 2010, current investments in renewable energies gained 21 billion US dollars with visible growth evident in growing economies. Consequently, this implies that should more and more growing economies as well as industrialized nations accept renewable energy sources, then global greenhouse gas emissions can be lessened with time (UNEP).

Although, mitigating global warming will be beneficial to present and future generations, on the other hand, this study discerns that failure in mitigation does not assure with absolute certainty that future generations will be hurt by humanity's current action or inaction (Bjornberg and Hansson 671-7). We do not have the certainty of who the future generations will be and what their concerns, tastes and preferences will be. It is somewhat impossible to speak for people whose interests are not known, much less their identity, whilst we affirm that they will have interests (Vanderheiden 128). What we can acknowledge, howbeit, is that future generations will have biological needs such as clean water and air.

3.3. THE KYOTO PROTOCOL AND ITS EFFICACY

Global warming, presently, needs short-term decisions and the utilization of governmental authority over private actions (Dessler and Parson 128). Governmental authority implies the government policies that are put in place to cut down greenhouse gas emissions. Hence

environmental discuss such as global warming cuts across state territory, multilateral agreements have been established. The United Nations Framework Convention on Climate Change (UNFCCC) became effective in 1994 (UN), imposed with the duty of managing climate change risks. The Kyoto Protocol was developed from the UNFCCC, representing a joint effort by nation-states to apply dedication toward the reduction of greenhouse gases (Krantberg 2-3). The Kyoto Protocol was decided upon on December 11, 1997, at a summit of the UNFCCC in Kyoto, Japan, as a vigorous attempt by the international community in mitigating climate change.

Being that there have been earlier multilateral efforts to address global warming and its effects like the Copenhagen agreement and the Montreal Protocol, this research anchors on the Kyoto Protocol because it is the treaty approved by many nations with consideration to climate change and its effects. Howbeit, this treaty's legal enforcement date was approved for February 16, 2005, although the UN agreed on it in 1997. Firstly, the treaty implored developed nations (also referred to as Annex 1 countries) to among other efforts, enforce and/or further intensify measures that would boost energy efficiency in pertinent economic sectors, safeguard sustainable forms of agriculture, promote and advance the use of new and renewable forms of energy as well as carbon dioxide isolation techniques (UN 2). This principle needs to be cost-effective as well as environmentally sustainable. Along with the above, the treaty implored the industrialized nations with the responsibility of steadily minimizing market imperfections, tax exemption, fiscal incentives and subsidies in all greenhouse gas sectors diverging from the treaty. Furthermore, these nations must encourage reforms in pertinent sectors aiming at promotion of actions minimizing greenhouse gas emissions. The treaty, in its second article, implored industrialized nations to make efforts to

implement measures that will reduce greenhouse gas emissions in a way that will reduce harmful effects of climate change, effects on the social environment and economies of the Parties involved, especially developing nations (UN 2). This is a silent affirmation that developed nations share the most blame as regards contribution to greenhouse gas emissions, which are presently harming developing nations.

The Kyoto Protocol seems to be the most essential present-day initiative in international climate policy. First, the treaty in Article 2 charged developed nations, hereby referred to as Annex 1 countries, to among other actions, implement and/or further elaborate policies that would enhance energy efficiency in relevant economic sectors, protect sustainable forms of agriculture as well as research, promote and develop use of new and renewable forms of energy as well as carbon dioxide sequestration techniques (UN). This principle ought to be economically viable as well as environmentally sustainable. In its second article, the treaty charges industrialized nations to strive and implement measures reducing greenhouse gas emissions in a way that will reduce the adverse effects of climate change, effects on international trade, effects on the social environment and economies of Parties especially developing countries (UN). This is a silent admission that developed nations have contributed the most in terms of greenhouse gas emissions which are today harming developing nations the most. Since Kyoto is a call to action it sets emission targets in its third Article (UN). It could be regarded as one of the well-organized multilateral environment treaties, springing up from the objectives it sets for greenhouse gas reductions which impact environmental and political and economic domains (Dessler and Parson 128). The focal point of reduction targets has been on the developed nations. It is these countries that were meant to reduce emissions by 5.2% below 1990. Howbeit, as of 2007, the United Kingdom and

Sweden were the only nations on track to meeting the target, not as a result of active mitigation policies but emerging from the premise that by 1990 the Soviet Union had not yet split up. So, Russia's input remained small. Additionally, the treaty put forward that for every ton of greenhouse gases emitted above targets from 2008 to 2012, the country must cut an extra 1.3 tons between 2013 and 2017 (128). Presently, Kyoto has not gained much success due to several reasons. One of which is disfavor of the Protocol by all State-Parties. Secondly, it failed to factor emissions as a result of changes in land use, reducing carbon sinks, increased Earth's population and emissions from natural gases like methane and CO_2 as a result of the heating process itself. Kyoto had not articulated the projected increase in world population by some billions in the next few years. If every human being were to produce 1 metric ton of CO_2 annually, we should anticipate an increase of CO_2 emissions by 1.85 billion tons by 2025 (Strom 233-5).

3.4. THE PARIS AGREEMENT

Following the commencement of the United Nations Framework Convention on Climate Change (UNFCCC) in March 1994 and the approval of the Kyoto Protocol in 1997, the world has been seeking for productive ways to mitigate the unfavorable effects of global warming. It may seem that the breakthrough arrived in December 2015 when a hundred and ninety-five nations assembled for the first time and concerted to take universal action to decrease global warming to well below 2°C, attain net zero emissions, and advance climate change impact resilience. It cannot be overemphasized that the adoption of the Paris Agreement constitutes a major transition and new hope for climate change policy, as it is more committed to holding all nations involved to commit to ensuring the decline in cimate change, while holding them accountable for their actions, both the developing and developed nations.

3.5. THE PARIS AGREEMENT & THE KYOTO PROTOCOL

In 1992, the approval of The United Nations Framework Convention on Climate Change in Rio marked the start-off point to reduce greenhouse gas emissions. Following this, the Kyoto Protocol in 1997 and the Paris Agreement in 2015 constitutes the two crucial documents discussed, signed, and approved by state parties in a bid to reduce global warming. Nonethelss, as the continuous emissions of developed nations and their effects on climate change are far higher than those of developing nations, it is sensible to discern the efforts that these nations should put up in order to reduce global temperature. This sub-topic aims to put up the several approaches used in Kyoto and Paris in a bid to reduce global temperature to below 2 ºC and to realize whether outcomes gotten from Kyoto has been taken into consideration with the aim of making the Paris Agreement an effective resource. Albeit, Paris and Kyoto are both intended to reduce global temperature to below 2 ºC, they nonetheless differ in the ways used to achieve this goal. One major difference is the way both agreements try to make developed and developing nations bound to address climate change (Change).

Albeit, Kyoto lawfully binds developed nations stated in Annex 1 to reduce their emissions, the Paris Agreement tried instead to narrow the gap between developed and developing nations by making all parties to willingly pledge to reduce their emissions through Intended National Determined Contributors. It has been perceived that during the initial (2005 - 2012) and following (2012 - 2020) devotion period of Kyoto, developed nations were expected to reduce their emissions by five and eighteen percent respectively, beneath preindustrial levels but did not expect developing nations to do the same (Grunbaum). One assumes that this stern adherence prevented Kyoto to uphold involvement by all parties and to procure emission reduction commitments from a few nations which then caused the US to

decline to accept the treaty. The second difference between the Kyoto and the Paris Agreement is the fashion in which they arbitrate between taking a concerted action in tackling climate change issues at international level while making sure that sensitive problems relating to the economic, political, and geographical domains of state parties are given focus. Incidentally, it is noteworthy that a tenacious issue in climate change debate is linked to how much policy stretch can be issued to nations in expanding domestic climate legislations. In tackling this dilemma, Kyoto took a descending approach with its focal point on ambition and accountability in that it obviously ignores the need to address the sensitive domestic issues encompassing climate change (Change) . Studying from Kyoto's experiences, the Paris Agreement saw a need to embrace an ascending approach in which international agreement develops from and reflect domestic policies, promote flexibility and participation. This was done by inaugurating INDCs into the Paris Agreement. As INDCs are optional and flexible, they make room for parties to coordinate their emission targets which actually mirror their economic, political, and geographical responsibilities and capacity to undertake emission reductions. Additionally, INDCs also authourize parties to pose their emission goals separately from the efforts of other parties and guarantee that all parties are able to advance towards clean energy in an functional manner (Change). Also, they are very appealing to most nation parties as they present irrelevant threat to their sovereignty. Albeit, although optimistic, the 2018 Intergovernmental Panel on Climate Change Report hints that the current INDC objectives will make the Paris Agreement ineffective. However, they remain the major component in making the Paris Agreement effective reinforced by other provisions and motivations such as technology transfer, finance, transparency, capacity building, and global stocktake. Lastly, Kyoto and Paris also took different methods with regards to application.

While Kyoto's application mechanism is based on facilitation and execution through the both committees imposed with performing these duties, the language used in the Paris Agreement is exculpating in nature. In Kyoto, the facilitative committee is charged with providing advice and aid to parties, but in the case that a party is found to have surpassed its assigned emission, a disciplinary action in the form of a pronouncement of non-compliance, an obligation to make corrections, and a thirty percent subtraction of emission allowance will be taken against the defaulting party (UNFCCC). Additionally, the defaulting party will also be mandated to present a compliance action plan and halt its entitlement to make transfers under emissions trading until the party is reinstituted (UNFCCC) . Albeit in the Paris Agreement, the focal point is on facilitation and furtherance of compliance instead of enforcement. It is also professional-based, transparent, nonconfrontational, non-punitive and pay key attention to the respective capacities and circumstances of the parties (Change) . This condoning and facilitative method that is focused on motivating parties to act in accordance through incentives and support has the possibility of arriving at better results in a complex and tactful issue such as climate change where global collaboration is key than a punitive method.

Albeit regarded as a historic, indicator and a turning point for mankind in solving climate change issues, the Paris Agreement is tilted towards failure despite the declaration of the Conference of Parties 24 as a success and the optimism in the 2018 IPCC Report. Besides their insufficiency to decrease global warming to below 2°C, most of the key emitters are yet to apply their INDCs. Debates between nation parties as to the basic science of climate change is still on and will linger as nations will continue to put economic growth and advancement ahead of any bond that might debilitate their competitiveness. Global climate temperature will probably continue to rise. Although supplementary procedures have been

issued at COP24 (UNFCCC) to strengthen the execution of the Agreement and to make certain that parties meet and expand their INDCs, but these are still on paper and there is no assurance that nation parties will do as they assured. The non-punitive method taken by the Paris Agreement, albeit reasonable, is not likely to have the type of outcome that will make the Paris Agreement effective. Whilst it still has all the requirements of an effective tool to decrease global warming, it has been critically weakened and not yet on course towards achieving its purpose.

Section Four

4.0. CONCLUSION, SUMMARY AND RECOMMENDATIONS

In the preceding sections, we had taken time to talk about climate science, the mitigation of global warming and efforts by mankind to arrive at a binding solution aimed at addressing the destruction of global climate. This implies that delay in lessening anthropogenic greenhouse gas emissions will end in adverse climatic conditions and weather crises. Nonetheless, swift action and mitigation of global warming by discontinuing or cutting down the use of fossil fuels will also be disadvantageous to world economies, mainly the developing nations. The more we delay in mitigating global warming, the more the ruin of our global climate. The faster we mitigate global warming without a global agreement, the more we impair the living conditions of the poor globally. Ethically, this requires a solution keeping in mind as Hardin argued, “freedom within a commons results in its eventual ruin” (Hardin 1968, p. 1248). If we continue to carry out actions as we do presently, our global ‘common’ climate is at risk of further ruin by global warming.

All things considered, this study proffers recommendations on what mankind could do in fixing the ethical dilemmas proceeding from global warming and its mitgation. With regards to this phenomenon, this study proposes that it is good-time moral rules were formulated and acted upon to austere the destruction of global climate. The indifference attitude exhibited by mankind similar to the farmers in Hardin’s thesis of a ‘commons-free-for-all-to-use’ has impelled us to the many climatic disasters witnessed around the world. We could say that, although we have moral rules guiding human society all over the world with regards to habits such as eating, sex, etc., it appears we do not have moral rules on atmospheric chemistry, hence the demand for a stronger framework this study proposes.

It is on the ground that moral rules exist that human beings judge actions of others. On such basis of moral rules, we are sad and shocked, for instance, by insensible and gruesome punishments in the name of religion, rape or even corruption. From this displease and disgust, we had made laws and even went ahead to carry out judgement on those that go against the laws. On the other hand, howbeit, when the environment is contaminated by carbon emissions and global climate ruined, we do not appear to be disgusted or we do not act like we see the damage in the first place. Awfully, even when it is made known to us how carbon emissions continue to destroy our global climate.

This study restates that mitigating global warming by halting the use of fossil fuels presently will impede global economic growth, which means that poverty levels will continue to be on the rise. Let us not be quick to forget that the world's biggest emitters of greenhouse gases are yet to put mechanisms in place to suppress these emissions and also are not bound by any viable global warming mitigation pacts. This is ethically awry as it is an injustice committed on the world's poorest. These developing nations at the same time have not enough resources to protect themselves from the quirks arising from global warming while industrialization takes place. Alternatively, inaction with regards to addressing the issues of global warming presently implies that future generations will inherit poor climatic conditions and possibly harsh weather catastrophes.

Generally, the discovery in this paper can be outlined as follows: (a) Global climate is changing and this is because of the increasing carbon emissions most of which are so because of upsurge in the burning of fossil fuels in both developed and developing countries. (b) rising carbon emissions and global warming will end in harsh and detrimental weather effects, specifically, in the developing countries, notwithstanding that developed and industrialized

countries contribute more to carbon emissions. (c) Mitigating global warming without a chance for a rudimental framework will albeit harm developing countries the most as a few rely upon the burning of fossil fuels for their industrial advancement. (d) Not mitigating global warming will not only be a problem to the present generations but will be a thing of concern to the soon-to-be-born generations and most likely destroy the chances of there being future generations at all. (e) Efforts by the global community to make and implement a framework to reduce global carbon emissions produced the Kyoto Protocol which nonetheless has yet to remarkably decrease global carbon emissions.

On the groundwork of the antecedent chapters, the following recommendations can be made: first, we should develop renewable energy sources to a great extent and cut down the capital costs of implementing these measures. These energy sources should be accepted by all countries, both developed and developing. Second, further studies ought to be channeled to the outcome of global warming mitigation strategies, mostly in the energy sector, transport sector, agricultural/land-use sector and other sectors. Third, further study and advancement of carbon emission isolation technologies, and support in installing or implementing these in both developed and developing nations ought to be conducted. Fourth, we should ensure that all nations, both industrialized and industrializing, implement global warming mitigation policies in line with their per capita emissions. Lastly, for the long term, the stronger binding framework should commit world governments to cut down emissions as well as establish penalties for defaulting nations and remunerations for successful nations to protect the interests of future generations.

The recommendations cited above imply the following ethically; the world in general ought to migrate from the use of fossil fuels and instead, advance environmentally sustainable

and renewable energy sources. Secondly, carbon capture techniques should be developed by all nations. These techniques include reforestation, as well as CO_2 sequestration. Thirdly, a stronger binding framework ought to be enforced by all state-parties. Finally, economic policies and mitigation efforts should be put into consideration for future generations as well as the present generation.

Works Cited

Becker, C and D Brown. "Introduction to the Special Section: Integrating Development Ethics and Climate Change." *Ethics, Policy and Environment* (2013): 37-42.

Bjornberg, K E and S O Hansson. "Five Areas of Value Judgement in Local Adaptation to Climate Change." *Local Government Studies* (2011): 671-87.

Boyle, S and J Ardill. *The Greenhouse Effect*. London: Hodder & Stoughton, 1989.

Chalmers, A. F. *What Is Thing Called Science*. UK: The Open University Press, 1978.

ClientEarth, C. *Fossil Fuels and Climate Change: The Facts*. 18 February 2022. 1 September 2022. <https://www.clientearth.org/latest/latest-updates/stories/fossil-fuels-and-climate-change-the-facts/>.

Cook and John. *Skeptical Science*. 2022. 14 August 2022. <https://skepticalscience.com/argument.php>.

Craggs, A. *World Health Organization*. n.d. 1 June 2022. <who.int/news-room/fact-sheets/detail/climate-change-and-health>.

Dessler, A and E Parson. *The Science and Politics of Global Climate Change: A Guide to the Debate*. UK: Cambridge University Press, 2006.

Drake, F. *Global Warming: The Science of Climate Change* . UK: Hodder Headline Group, 2000.

Earth Science. n.d. 1 June 2022. <cliffnotes.com/study-guides/earth-science/insolation-and-seasons-on-earth/solar-radiation>.

Gardiner, Steven. *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*. New York: Oxford University Press, 2011.

Goudie, A. *The Human Impact on the Natural Environment*. UK: Basil Blackwell Ltd, 1987.

Gupta, J. *Our Simmering Planet: What to do about Global Warming*. New York: Zed Books, 2001.

Hardin, G. "The Tragedy of the Commons." *Science, New Series* (1968): 1243-48.

IPCC. *IPCC Reports on Climate Change*. August 2019. September 2022. <https://www.conservation.org/stories/ipcc-reports-on-climate-change?>.

Jamieson, D. "Adaptation, Mitigation and Justice." *Climate Ethics: Essential Readings* (2010).

Johnson, B. "Ethical Obligations in a Tragedy of the Commons." *Environmental Values* 12.3 (2003): 271-87.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1962.

Larkin, A. "The Ethical Problem of Economic Growth." Shrader-Frachette. *Environmental Ethics*. The Boxwood Press, 1993.

McCay, J and M J Acheson. *The Question of the Commons: The Culture and Ecology of Communal Resources*. Arizona: University of Arizona Press, 1990.

Patz, J, et al. "Impact of Regional Climate Change on Human Health." *Nature* (2005): 310-17.

Stern, N. "What is the Economics of Climate Change?" *World Economics* (2006): 1-10.

Strom, R. *Hot House: Global Climate Change and the Human Condition*. USA: Praxis Publishing Ltd, 2007.

UN. *Kyoto Protocol to The United Nations Framework Convention on Climate Change*. Kyoto, Japan: United Nations, 1998.

UNEP, United Nations Environment Programme. 2015. 17 May 2022. <www.unep.org>climatechange>mitigation>.

Vanderheiden, S. *Atmospheric Justice: A Political Theory of Climate Change*. UK: Oxford University Press, 2008.

WBG. *Climate Change Knowledge Portal*. 2021. 12 September 2022. <https://climateknowledgeportal.worldbank.org/overview>.