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Ethical Dimension and Divergence of Climate Change; An Approach to Climate Change Morality

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Abstract

The study examined the ethical dimension and divergence of climate change; an approach to climate change morality which has raised imminent concerns and propositions. People's attitudes, behaviours, wrong perceptions and involvement in unhealthy acts engenders climate change; hence putting our ecosystems, environment and biodiversity in danger. Considering the excesses and negative impacts of climate change, various stakeholders involving governments, corporations, NGOs, groups, and individuals are taking practical steps in addressing climate change issues, by considering the ethical and moral implications. However, addressing these disturbances draws strength and energy from right motives and guided behavioral approaches. In as much as financial remunerations is required in counterbalancing climate change, human behaviors and attitudes are the best bet and offers a lasting solution. Consequently, globally climate justice and environmental justice are currently being deployed as ethical weapons in addressing global warming. This hopes to provide fresh perspectives on climate change ethics and modifications. it is recommended that orientations, seminars, workshops, symposiums and climate change conferences bothering on ethics, morality and responsibility should be provided at all levels of the socio-strata by various governments of nations to reposition the mind and mindset of the individuals, group of persons and the populace.
Keywords: Ethical dimension; Ethical divergence; Climate change; Ethics; Morality.

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1. Introduction

In recent times, climate change is influencing the whole world causing havoc and disruptions virtually in every aspect of nonhuman and human existence. Nowadays, people consciously disrupt the environment and biodiversity via various unhealthy human practices such as burning of fossil fuels, overgrazing and overstocking of farm animals, carbon emissions, bush burning, gas flaring, unsuitable and harmful agricultural practices, etc thus causing severe harm to the atmosphere (global warming) and resulting into prevailing change in climate [1]. Changing the attitude, behaviours, and morality of individuals or group of person's to climatic issues calls for serious concern [2]. Considering the excesses and negative impacts of climate change, various stakeholders involving governments, corporations, NGOs, groups, and even individuals are now taking practical steps in addressing climate change issues by considering the moral implications.

Anthony [3], noted that the world is currently engulfed with the issue of climate change and had focused attention on "climate ethics". The question of who is to blame, who should be held accountable, and what should and shouldn't be allowed are just a few of the complex ethical issues that human-induced climate change poses. As a result, ethical considerations are being disregarded or hidden in climate talks, policies, and conversations since they have not been addressed in the scientific or economic literature on climate change or in policy debates. Damian [4] observed that individuals or group of persons inducing climate change in real sense do not suffer the adverse effects of it but rather the innocent ones that do not contribute to it. That is individuals mostly at risk from the effects of climate change are not necessarily the same people who are most to blame for it. Globally according to Igor [5] climate justice and environmental justice are currently being deployed as ethical weapons in addressing global warming. Stephen [6], posited that the excesses and negative impacts of climate change have ignited interest in many nations and organizations in considering the moral implications. Phoebe, et al. [7], stated that climate ethicists have proposed solutions via practicing climate ethics to change the attitude and wrong perception of people in intentionally inducing climate change through variant unhealthy engagements. It should be noted that glaciers are still melting, sea surface temperatures are rising, and sea levels are still rising, all of which are having a substantial effect on ecosystems that depend on cold temperatures. Phoebe, et al. [7], further observed that climate ethics examines what humans owe to the earth's systems while also taking into account existing mitigations. As time passes, the impacts worsen, raising grave concerns as the planet gets closer to irreparable harm. According to Grasso and Markowitz [8] various methods are being developed to lower pollution-causing carbon emissions via ethical considerations. We can better comprehend the nature of the climate problem and the limitations on potential remedies by using an ethical approach to climate change. Chandra, et al. [9] noted that actions in solving climate change ethical issues often generate important questions on fairness, justice and equity and how climate change challenge these core values. However, considering the impact of climate change, the 2018 IPCC Special Report on Global Warming at 1.5 °C created quite a disturbance and spurred a lot of interest. According to the research, global warming should be kept to 1.5 °C over pre-industrial levels in order to prevent catastrophic effects [10]. Though, this target is yet to be achieved worldwide. Scientists have suggested a drastic change in behavior to meet this global target, but this can only be done with a significant shift in our mindsets. The public awareness campaign of UNESCO's Strategy for Action on Climate Change 2018–2021 is centered on the idea of "Changing the Mind, not the Climate," as its tagline [11]. The 2030 Agenda for Sustainable Development of the United Nations and the 2015 Paris Agreement (COP21) are both in agreement with this germane idea. It outlines a wide range of actions in various fields, including Education for Sustainable Development (ESD), Ocean Management (through the Intergovernmental Oceanographic Commission, IOC), Water Security (through the International Hydrological Programme, IHP), and the Cultural and Scientific Updates on climate change [11]. More initiatives are also underway to educate people about climate change through the media and through the UNESCO Associated Schools Network (ASPnet) [12]. Along with these projects, there are other ones such as the UNESCO Chairs on Climate Change and Sustainable Development, Climate Frontlines, networks of indigenous people and other vulnerable communities, and the grassroots UNESCO Green Citizens Pathfinders for Change initiatives [13]. Above all, ethical complexities of climate change jeopardize not only the planet's ecosystems but also our fundamental rights by fostering injustice and escalating disparities. As the ethical implications of climate change are still largely unexplored, UNESCO adopted the Declaration of Ethical Principles in relation to Climate Change in November 2017. This document serves as a resource for all social actors, particularly political leaders, and enables the best possible decision-making. This hopes to provide fresh perspectives on climate change ethics and modifications. The issues of justice and equality, respect for human rights, solidarity, scientific and political integrity, as well as individual and communal accountability, must be the main cornerstones of our actions on a worldwide scale in addressing climate change [13].

In the light of the above, the morality of people and individuals regarding climate change have not being fully explored, informing the rationale for this study. Though, several studies on climate change have been conducted across the world. Damian [4], examined the ethics of climate change; a systematic literature review. Phoebe, et al. [7], looked at ethical considerations regarding the effects of climate change and planetary health on children. Stephen [6], investigated ethics and global climate change. Chandra, et al. [9], x-rayed the introduction of climate change and the legal, ethical, and health issues facing healthcare and public health systems. Grasso and Markowitz [8], examined the moral complexity of climate change and the need for a multidisciplinary perspective on climate ethics. José and Juan [14], evaluated climate change, ethics and sustainability; an innovative approach. While Anthony [3] examined ethical obligations for climate change mitigation; basic principles, reply to objections, and implications. Surprisingly, none of the above studies bothered to examine the ethical dimension and divergence of climate change; an approach to climate change morality, this automatically create a lacuna in knowledge, and thus

portraying the relevance, rationale and importance of the study. This study tried to examine the attitudes, behaviours and morals of individuals or group of persons in inducing climate change without considering its adverse implications. The right and wrong attributes of people to climate change in the present dispensation differs this study from previous studies carried out.

Fig-1. Divergence of Climate Change

2. Ethical Theories on Climate Change

Understanding the obligations of the present generation to future generations who will be impacted by our activities on climate disruption today requires a direct application of the environmental ethics principles of utilitarianism, deontology, and caring [15]. Concepts of "discounting" from environmental economics, individual rights and expectancies as outlined by Immanuel Kant's deontology and the ethics of caring as defined by Des-Jardins are particularly pertinent. Utilitarianism, as advocated by Jeremy Bentham, seeks to maximize good for the greatest number of people over the longest period of time. Bentham also asserted that we all have a tendency to place a higher value on immediate future benefits than on benefits that would come later in time [2]. This is a particularly pertinent idea given that mitigating climate change now would only benefit future generations if financial expenditures are incurred and action is taken. In contrast to weighing the pros and disadvantages of various options and attempting to maximize the "good," Kant highlighted the significance of protecting individual rights. The rights of living individuals and the needs and rights of future generations therefore appear to be in conflict when utilitarianism and deontology are applied. Mark Sagoff in his essay "Zuckerman's Dilemma," transcends this dilemma by emphasizing an ethics of care that emphasizes intrinsic value, love, and caring for other people and non-human life (our environment) [16]. Pope Francis, the leader of the Roman Catholic Church, urges people to care for God's creations (lands, water, seas, etc) and other people for the sake of future generations, saying that doing so "has to do with the ultimate meaning of our earthly sojourn." Similar to this, plans for adaptation and resilience in the face of climate change have been developed using traditional ecological knowledge and respect for life and nature, especially from spiritual viewpoints and ancestral beliefs.

3. The UNESCO Declaration of Ethical Principles in Relation to Climate Change Solemnly Expresses the Concern of UNESCO Member States that Climate Change could Create Morally Unacceptable Damage and Injustice

On November 13, 2017, at the 39th session of the UNESCO General Conference, held in Paris, 195 countries signed the UNESCO Declaration on Ethical Principles in Relation to Climate Change. They demanded that international allies should unite behind this goal. This Declaration is a concise list of the universally accepted ethical principles that ought to direct policy and decision-making at all levels and encourage individuals to take action on climate change. The moral direction provided by this UNESCO Declaration is meant to support governments' multilateral initiatives, such as the agreements reached under the United Nations Framework Convention on Climate Change and the scientific studies conducted by the Intergovernmental Panel on Climate Change [12]. One of the key ethical principles in respect to climate change, according to the new Declaration, is "avoidance of harm." People should predict, avoid or reduce harm, wherever it may emerge, i.e. from climate change, as well as from climate mitigation and adaptation policies and initiatives. The exclusive focus of one of the other ethical standards is "scientific knowledge and honesty in decision-making." According to this statement, "decisions should be founded on right morals and be guided by the greatest available knowledge from the scientific and social sciences." States should "take measures that help defend and maintain the independence of science and the integrity of the scientific process". The following ethical principles have also been identified: solidarity, sustainability, justice and equity, and a precautionary approach ([13]. The work that UNESCO has already done on the moral standards related to climate change is built upon in this declaration.

Fig-2. Structure of Changing Climate

# 4. The Ethical Principles of Climate Change

Not only does climate change put our ecosystems in danger, but it also erodes the foundation of our fundamental rights, widens disparities, and produces new kinds of injustice. To address climate change and lessen its effects require more than just political will and scientific understanding. It also necessitates taking a more comprehensive approach in addressing complex climate problems [17]. The adoption of the declaration of ethical principles in relation to climate change by UNESCO is to assist member states and other stakeholders in making appropriate decisions and implementing effective policies for sustainable development, adaptation to climate change, and the mitigation of its negative effects [18]. Any commitment must have ethics at its fundamental foundation. As a driving factor, ethics may direct action, ease arbitration, reconcile divergent interests, and set priorities. Ethics can link theory and practice, trigger broad ideas and political will, as well as global knowledge and local deeds [12]. Six ethical tenets serve as the foundation of the UNESCO Declaration: harm reduction; to better foresee the effects of climate change and implement responsible and efficient policies to mitigate and adapt to it, particularly through the creation of low greenhouse gas emissions and programs to promote climate resilience. Avoid delaying the adoption of steps to prevent or minimize the negative effects of climate change because there is not conclusive scientific evidence. Involving justice and fairness that is in the spirit of fairness and equity, respond to climate change in a way that benefits everyone. Permit access to legal and administrative actions, including redress and remedy, for persons who are unfairly impacted by climate change (due to insufficient measures or poor policies). However, adopting new paths for growth that allow us to sustainably preserve our ecosystems while constructing a more equitable and morally upstanding society that is more climate change resistant is known as sustainable development [19]. The sectors of food, energy, water insecurity, oceans, desertification, land degradation, and natural disasters, where the humanitarian impacts of climate change can be particularly severe, must receive special consideration. Solidarity; in assisting those who are most at risk from climate change and natural catastrophes, both individually and collectively, especially in the Least Developed Countries (LDCs) and Small Island Developing States (SIDS) [20]. Climate change could be mitigated by developing timely cooperative action in a number of areas, such as information sharing, capacity building, and technology creation and transfers. The best way to support decision-making and the execution of pertinent long-term strategies, including risk prediction, is to strengthen the interface between science and policy. This is done by utilizing scientific knowledge and integrity in decision-making. Again, supporting the impartiality of research and broadly broadcasting its conclusions for everyone's benefits. With the help of the 1998-founded World Commission on Ethics of Scientific Knowledge and Technology, (WCESKT) UNESCO has benefited from WCESKT in achieving its goals and objectives especially in environmental ethics [13].

5. Offsetting the Cost of Climate Change via Ethical Operations

The only way to compensate for the loss of irreplaceable ends is to offer beneficiaries with alternatives that they believe will enable them to maintain their standard of living at the same level before the loss [21]. For instances, the community of fishermen might receive funds to help them transition to farming so they can maintain the same standard of living, level of food security, and social standing as previously. However, if not properly addressed, they will be forced to change their preferences; this may violate their integrity and personal liberty and eventually result in them suffering unjustified pain. Note, in spite of the above transition, no amount of remedy will ever entirely address behaviors that cause the loss of irreplaceable assets to others [22]. This is particularly significant in light of monetary payments. Any compensation given to a community that has been hurt by extension cannot make the community whole again if the ends are irreplaceable. However, making monetary settlements and taking other procedures that acknowledge unjustified loss and damages are undoubtedly crucial steps toward restoring a fair baseline distribution. Climate change causes pain and grief owing to its devastating effects and anomalies especially when it is human induced. Humans have been reported severally to trigger climate change via carbon emissions, source of livelihood, lifestyles, and other economic and non-economic operations and activities [23]. However, compensating for these disturbances draws strength and energy from right motives and guided behavioral

approaches. In as much as financial remunerations is required in counterbalancing climate change, human behaviors and attitudes are the best bet and offers a lasting solution.

Fig-3. Dimensions of Climate Change
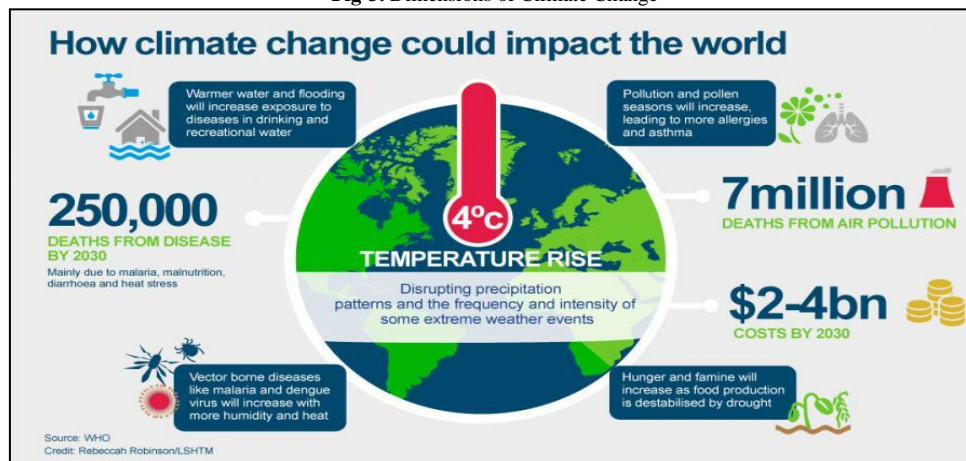
6. Ethical Concerns and Concepts of Climate Change Policy

Policies regarding climate change mitigations must be fully implemented with ethical considerations. It must be tailored in addressing the divergences and dimensions of climate exigencies by involving every stakeholder across the community lines. International climate policy must necessarily incorporate important principles within its legal operations. The United Nations Framework Convention on Climate Change was floated to deploy ethical principles and policies in addressing the challenges and problems of climate change [1]. Its ethical goals and policy is to protect current and future generations of mankind, and lists the possible preventions of dangerous anthropogenic interference within the climate system. These goals must be met while also preserving ecological, subsistence, and economic values [24]. There is no question that ethical issues lay at the heart of climate policy. However, significant issues remain, including how to interpret, harmonize, and apply the pertinent values, as well as whether or not the legal account of them has to be expanded. Ethical considerations include.

6.1. The Treatment of Scientific Uncertainty

Despite substantial opposition from those who doubt the veracity of climate change research, a large body of evidence supports the idea that climate change constitutes a hazard that requires serious response.

6.2. Responsibility for Past Emissions

One idea for combating climate change claims that accountability should be determined by historical emissions, but this is met with fierce hostility.

6.3. The setting of Mitigation Targets

The majority of individuals agree that action should be taken to restrict future emissions, yet such a limit creates serious ethical concerns, particularly on distributive and procedural justice.

6.4. The Place of Adaptation in Policy

We are already committed to some warming owing to past emissions, therefore adaptation measures must be an element of any realistic climate policy, but there are still concerns about how much they can be included in policy.

6.5. The Place of Geo-Engineering in Policy

Although geo-engineering has been advocated as a response to climate change for many years, it has only recently gained some traction, raising questions about the risks involved [10].

The position of climate policy within broader approaches to global justice, environmental ethics, and the ethics of human wellbeing is particularly getting interesting. In example, a lot of the present conversation assumes that we must operate mostly within the limitations of the geopolitical structure in place. However, it is obvious that the system may be challenged both practically and philosophically by climate change. The study of climate morality and how the world is dealing with it is still in its infancy. As a result, the focus of present theoretical and practical effort is primarily on defining the "ethics of the transition," which will enable us to close the gap between what is and what ought to be. Determining global goals for institutions and modes of living that foster a more just and sustainable future is just as crucial as determining the ethics of this early stage of climate change morality. Ethical conduct should be a major component of this "ideal" enterprise, in order for us to avert climate experiences [10].

7. Challenge to Ethical Action of Climate Change

Due to the convergence of three significant obstacles to moral action in a mutually reinforcing manner, climate change has been called the "perfect moral storm". The first difficulty is brought on by the fact that climate change is

an essentially global phenomenon [25]. Regardless of their source, greenhouse gas emissions can affect the climate everywhere on the earth once they are released. It is frequently claimed to lead to a "prisoner's dilemma" or "tragic commons experienced all over the world. Some country still prefers to continue emitting without restrictions, thus causing more harm to the atmosphere while some country would prefer to limit global emissions in order to reduce the risk of severe or catastrophic impacts. Many of the industrial nations of the world care less of the negative impacts of climate change and thus this negate its mitigations and utmost control. While this is true, some countries that place emission limits fail to abide by it therefore exacerbating climate impacts. The second difficulty is the significant cross-generational effects of existing emissions. These emissions usually stay in the atmosphere for a very long time, causing adverse climate effects for centuries or even millennia [26]. The third obstacle to ethical action is that many of the pertinent topics, such as international justice, generational ethics, scientific unpredictability, and the proper interaction between humans and the rest of nature have inadequate theoretical frameworks. This gap in theory creates imbalances and impairs moral values in preserving nature and the environment. For instance, climate change presents issues such as whether we have a responsibility to preserve our environment and biosphere without disruptions or blames [27]. In response to this, individuals or firms who significantly contribute to climate change are less likely to admit defaults or unfairly shift majority of the costs of their actions on other individuals or government. Because of how difficult it is to navigate the ethical and scientific landscape, we may be particularly vulnerable to justifications for inaction (or incorrect action) that masquerade as moral reasons but are ineffective and self-deceptive. Unfortunately, there is some proof of this in the continuing political slowness in creating a strong policy measures in reducing climate impacts [26]. This also questions our morals and articulates strong arguments for how and why we should confront climate change.

8. Ethical Divergence Approach to Climate Change

As a generation, we have a serious responsibility to prevent severe climatic damages to the future. More consideration on global, intergenerational, and ecological justice is necessary to determine the more precise trajectory of future emissions. For instances, reducing emissions significantly would likely be preferable from the standpoint of the future generations and some vulnerable species [28]. The essence is to limit the severity of future climate impact on the future generations to come. Although this may appear to be unfair and unjust as the burden would fall on the present generation to bear the emission reduction cost and consequences. Moreover, in as much as present emissions could be traded for the benefits of the current or present generation, its potential catastrophic effects on humans, non-human species and the environment remains disturbing. To maintain biodiversity, and sustain our unique ecosystems, emissions should be controlled to the minimum. On the other hand, global ecosystems will alter and new species will emerge as a result of climate change in the long run. It's unclear how we should interpret our duties in light of these changes. The theoretical exploration of the future trajectory is still lacking. However, given the aforementioned concerns, emission targets need greater ethical justifications. As a result, they are likely to face increased philosophical criticism if and when the world begins to take meaningful action [29]. The issue of how to equitably distribute whatever total world emissions are permitted at a given time under a suitable long-term trajectory has received noticeably more philosophical attention than the subject of how to reduce emissions overall. It turns out that the majority of authors concur that wealthy countries should bear the majority of the burden than emerging countries in mitigating climate change since they emit the most. This consensus is supported by several unique but interrelated justifications. The majority of the cumulative emissions that are currently causing climate change are causally attributable to industrialized countries, which is supported by historical narratives of justice. The argument for it is supported by the fact that wealthy countries continue to emit significantly more than developing countries [30]. Un-avoided consequences exist in tackling climate change. Due to the climate system's inertia, we have already committed to certain potentially disastrous consequences which could be possibly averted and otherwise. For instances, migrating vulnerable populations as sea levels rises could be adapted but however, some negative effects may not be able to be avoided and may just have to be accepted (e.g., increased storm intensity and habitat destruction) [8]. Who should be responsible for carrying the burdens such as funding the adaptation in the first situation or paying those damaged in the second is a concern in both types of cases. These challenges entail complicated questions of global, intergenerational, and ecological justice. A large portion of the ethical consensus that rich countries should shoulder the majority of the cost of combating climate change seems to apply to unavoidable effects. Nevertheless, it has been claimed that a unique conceptual approach should be used because this problem is considerably more retrograde than problems with emissions [31]. To resolve the pertinent conceptual problems and determine how policy should be implemented; much work needs to be done. The legacy of past wrongs, such as colonization, slavery, economic exploitation, and so forth, can occasionally have an impact on a person's susceptibility to climate change. In certain situations, unavoidable climatic impacts may amount to "compound injustice". Additionally, it's likely that some effects like sea level rise could endanger the very existence of whole people and cultures like small island nations and thus evolving ethical fairness and considerations [7]. The deliberate modification of the global climate (i.e., engaging in geo-engineering) with the objective of limiting such repercussions would, of course, be a completely different strategy to address impacts that are already anticipated. Injecting sulfur into the stratosphere, for instance, has been proposed as a way to counteract temperature increases by increasing the amount of solar radiation that is reflected back to space [32]. The conversation has thus far centered on how best to address climate change as a whole, but the question remain to what extent do individuals engage in response to climate change? Some contend that people should take personal responsibility for their decisions in responding to climate change and cultivate a set of "green virtues" that are independent of how others

react to climate issues, while others maintain that people should engage ethical approach and be obliged to change their consumption or lifestyle choices [1].

9. Ethical Dimensions of Climate Change

At the 10th Conference of Parties to the United Nations Framework Convention on Climate Change in Buenos Aires, Argentina, in December 2004, the collaborative program on the ethical dimensions of climate change was officially inaugurated. The Buenos Aires Declaration on the Ethical Dimensions of Climate Change was the main outcome of this conference [12, 13]. The program on the Ethical Dimensions of Climate Change seeks to:

- Promote open discussion of the ethical implications of climate change, especially in relation to those topics raised by specific stances taken by governments, corporations, NGOs, groups, or people on climate change policy issues;
- Make sure that people from all over the worlds, especially those who are most vulnerable to climate change; participate in any ethical inquiry about responses to climate change.
- Develop an interdisciplinary approach to inquiry about the ethical dimensions of climate change.
- Support publications that examine the ethical dimensions of climate change and make the results public.
- Include ethical analysis in the work of other organizations involved in climate change policy, such as the Intergovernmental Program on Climate Change and the Conference of the Parties to the United Nations Conference on Climate Change.

10. Climate Justice

Climate justice is a notion that deals with the right division, fair sharing, and equal distribution of the advantages and disadvantages of climate change, as well as the duties to solve it. Although "justice," "fairness," and "equity" are not entirely synonymous, they belong to the same family of words and are frequently used interchangeably in politics and negotiations. By these terms, climate change is approached as a moral, legal, and political concern rather than a solely environmental or physical one. Climate issues can be accomplished by connecting the causes and consequences of climate change to ideas of justice, particularly environmental justice and social justice [2]. In terms of equity, human rights, collective rights, and historical accountability for climate change, climate justice addresses these ideas. To put it simply, there are two basic ideas of climate justice: distributive justice, who highlights who pays the costs of both climate change and the measures taken to address it, and procedural justice, which promotes fair, open, and inclusive decision-making. The IPCC's Working Group II has now added "recognition" as a third category of climate justice principles, which includes basic decency, active engagement with, and fair treatment of various cultures and viewpoints [1]. Alternately, justice's fundamental tenets of respect and recognition could be viewed as its procedural and distributive justice's underlying principles.

11. Ethics of Mitigation, Adaptation and Geo-Engineering

Currently, three approaches are being used to combat climate change. The two traditional strategies are adaptation and mitigation. Here, the term "mitigation" refers to actions taken to reduce greenhouse gas emissions. Contrarily, adaptation requires taking steps to lessen the negative effects of climate change [25]. In addition to these two established methods, a new strategy for combating climate change has recently gained attention: geo-engineering. However, this strategy is still in its infancy in terms of scientific advancement. In light of this, geo-engineering has been proposed as an intentional and potentially economical method for large-scale planetary climate management.

12. Climate Mitigation

Reducing the emissions of greenhouse gases that are warming our planet is what is meant by "mitigating" climate change. Retrofitting buildings to make them more energy efficient; utilizing renewable energy sources like solar, wind, and small hydro; assisting cities in developing more sustainable modes of transportation like bus rapid transit, electric vehicles, and biofuels; and encouraging more sustainable uses of land and forests are all examples of mitigation strategies [33]. The basic energy requirements of almost 1.4 billion people worldwide are satisfied by traditional fuels like coal and wood which triggers climate change. These traditional fuels also have negative effects on the health of its users causing death in most cases especially women and children, and it's quite unsafe for the environment. The demand for energy is expected to increase by more than 50% by 2035, with developing nations experiencing even greater increases. All of these can be mitigated by clean energy that is safe for both the environment and the populace [34]. The 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report on 1.5 Degrees of warming emphasizes the urgency of the necessary climate actions: if we are to be able to stay within the safety limits established by the Paris Agreement, global emissions must peak by 2030 and rapidly decrease to net-zero by 2050 [1]. Virtually all natural and economic systems are impacted by climate change. This relationship between climate change and biodiversity, land degradation, forests, chemicals and waste, and international seas emphasizes how crucial it is to consider the effects of climate change in all that we do. In order to pursue various global environmental advantages across conventions while minimizing trade-offs and duplication, the UNFCCC has the unique potential to promote natural solutions built with systems thinking [11]. The UNFCCC plan for mitigating climate change intends to assist developing nations in making fundamental transitions to low-emission development paths that are in line with the goals of the Paris Agreement and the IPCC. The plan is created to be as complimentary

as possible to other climate finance sources, such the Green Climate Fund, in the context of the changing climate. Three main goals guided the financing for climate change mitigation initiatives:

12.1. Encourage Research and Technology Transfer for Breakthroughs in Sustainable Energy

Technology is a critical tool for reducing or slowing the growth of greenhouse gas (GHG) emissions and stabilizing their concentration. To that end, technology innovation, particularly when pushed in collaboration with the private sector, can aid in the development of new or existing markets for eco-friendly goods and services, creating jobs and fostering economic growth while reducing GHG emissions. Clean technology, business models, encouraging policies and strategies, and financial instruments that encourage private sector engagement for climate-friendly technologies and innovations are just a few examples of the innovative solutions that can be tested using resources from UNFCCC. In order to support climate mitigation, the UNFCCC has prioritized four entry points: decentralized renewable energy with energy storage; electric drive technologies and electric mobility; accelerating adoption of energy efficiency; and clean tech innovation. These entry points were chosen because of their innovative nature and complimentarily with other financial mechanisms.

12.2. Showcase Systemic Effects of Available Mitigation Measures

Climate change has an impact on almost all natural and economic systems. The interplay between climate change and every aspect of the UNFCCC work highlights the significance of recognizing the implications of climate change in other focal areas by utilizing mitigation options and incorporating climate resilience measures, while simultaneously promoting numerous global environmental benefits in an integrated and holistic manner. Other beneficial areas include sustainable cities, food systems, land use and restoration, and sustainable forest management.

12.3. Integrating Mitigation Considerations into Sustainable Development Plans

UNFCCC is still working to create the right frameworks, data, and analysis to mainstream climate change concerns into national planning and development priorities. A good example of this is the UNFCCC support for National Communications, Biennial Update Reports, Technology Needs Assessments, Nationally Determined Contributions, and the Capacity-building Initiative for Transparency [11].

13. Climate Adaptation

Actions that mitigate the negative effects of climate change while seizing potential new possibilities are referred to as climate change adaptation. It entails modifying laws and practices as a result of seen or anticipated climatic changes. Examples of adaptation strategies include extensive physical adjustments, such as the construction of sea-level rise fortifications, as well as behavioral modifications, such as people cutting back on food waste [35, 36]. International efforts to address climate change adaptation are stepping up in order to get ready for repercussions that could affect water resources, crop yields, and the health of marine ecosystems, such as rising seas, hotter temperatures, severe droughts, and other effects. To protect progress made in development and to meet the requirements of underdeveloped nations that are particularly vulnerable to the effects of climate change, urgent adaptation measures are required [33]. The goals of UNFCCC climate change adaptation entails;

13.1. Efficient Innovation and Technology Transfers

Climate change adaptation lessens vulnerability and boost resilience. Technological, social, and institutional innovation—which may be gradual or transformative in nature—is necessary for effective solutions to climate change. It is necessary to disseminate, adapt, and implement climate resilience technology throughout the developing world due to the more obvious effects of climate change and variability.

13.2. Widespread Resilience and Adaptation to Climate Change for Systemic Effects

Ecosystems and livelihoods face a cross-cutting, systemic threat from climate change. The UNFCCC is working harder to create adaption initiatives to address ecosystem issues and other environmental hazards while ensuring conducive atmosphere and sustainable developments. Examples include climate-resilient smallholder food systems; and clean and resilient energy solutions, particularly for deprived populations.

13.3. Create Favorable Conditions for Efficient and Comprehensive Climate Change Adaptation

In accordance with the IPCC, the UNFCCC is still providing assistance to nations as they create national adaptation plans. These plans offer a structure that nations can use as a guide when incorporating climate change adaptation factors into long-term planning and procedures [11].

14. Geo-Engineering

Climate change is being exacerbated by the natural greenhouse effect and is being brought on by the huge rise in greenhouse gases in the atmosphere brought on by human activities via industrial revolutions [37, 38]. Many scientists now agree that geo-engineering should be taken into account as part of a solution to prevent dangerous

levels of climate change [39]. Without some kind of geo-engineering, it will be difficult to meet the Paris Agreement's goal of keeping atmospheric warming well below 2°C, let alone the more ambitious targets of a 1.5°C limit. The term "geo-engineering," frequently referred to as "climate engineering," refers to a number of techniques for making extensive large-scale changes to the Earth's natural systems, including the oceans, soils, and atmosphere, in order to prevent climate change [40]. Geo-engineering is the deliberate, extensive alteration of the Earth's environment and climate for the purpose of halting further climate change, reducing the rate of global warming, and minimizing its negative impacts on human society and the biosphere [41]. Natural climate solutions (such as ecosystem restoration and the use of blue carbon), solar radiation management, carbon dioxide removal, and a wide range of methods for reducing the effects of climate change are all included in geo-engineering approaches. Consequently, geo-engineering would entail attempting to alter Earth's temperature or climate via techniques like ocean fertilization, bleaching clouds, adding sulfate particles to the atmosphere to increase solar reflection, or dispersing iron in the ocean to absorb carbon dioxide [42]. Rekindled interest in geo-engineering has been attributed to the climate change crisis. Governments across the world are seriously considering how to control the climate in order to reduce or perhaps halt uncontrolled climate change; hence the main goal of geo-engineering schemes is to reduce atmospheric carbon dioxide and thus creating conducive atmosphere and environments. With varying degrees of success, researchers have also tested crops engineered to boost carbon uptake, via the absorption of carbon dioxide, carbon capture and storage [43]. Other geo-engineering techniques concentrate on preventing the atmosphere from being heated by the sun. Examples of this strategy include placing sun-shields or mirrors in space to reflect the sun, blasting seawater hundreds of meters into the atmosphere to encourage the creation of stratocumulus clouds that will block sunlight, or injecting sun-blocking particulates into space [44]. Geo-engineering techniques, however, have not yet been demonstrated to be effective on a global scale, they may have unanticipated bad effects on the ecosystem, and others contend that they may deter efforts to reduce greenhouse gas emissions [45]. There are concerns about how to control technology that have applicability and impacts across national lines and public consent for research, while deployment may create impediments to its use.

15. Conclusion and Recommendation

Climate change has become a topical issue and concern across the world and thus combating it requires proactive and practical steps amongst different stakeholders. Who is to blame, who should be held accountable, and what should and shouldn't be allowed are just a few of the complex ethical issues that human-induced climate change poses. It should be noted that mitigating human inducement of climate change evolves ethical approach and behavioural patterns which should be pursued objectively and independently. Climate actions that trigger destruction and severe consequences should be approached with high level of morality and sense of judgment to avert its ugly occurrences. However, world countries are yet to come to terms with climate morals and ethicality which is currently being proposed at national and international climate conference gatherings and symposiums. Hence the study recommended nations of the world to embrace climate change morality and climate change behavioral approach and modifications to address the negative impacts of climate change ravaging the whole world.

References

[1]   IPCC, 2022. "Climate Change 2022: Impacts, adaptation and vulnerability: Intergovernmental Panel on Climate Change." pp. 101-121. Available: https://www.ipcc.ch

[2]   Simon, C., 2020. "Climate justice." Available: https://plato.stanford.edu/entries/justice-climate/

[3]   Anthony, A., 2021. "Ethical obligations for climate change mitigation: Basic principles, reply to objections, and implications." *The International Journal of Climate Change Impacts and Responses,* vol. 12, pp. 3-15.

[4]   Damian, J. B., 2021. "The ethics of climate change: A systematic literature review." *Accounting and Finance,* vol. 62, pp. 2651-2665.

[5]   Igor, K., 2016. "Is climate change a moral issue? Effects of egoism and altruism on pro-environmental behavior." *Current Urban Studies,* vol. 4, pp. 19-22.

[6]   Stephen, M. G., 2004. "Ethics and global climate change." *University of Chicago Press Journals,* vol. 114, pp. 555-600.

[7]   Phoebe, C. M., Williams, B. M., and David, I. A. P., 2021. "Ethical considerations regarding the effects of climate change and planetary health on children." *Journal of Paediatrics and Child Health,* vol. 57, pp. 1775-1780. Available: https://doi.org/10.1111/jpc.15704

[8]   Grasso, M. and Markowitz, E. M., 2015. "The moral complexity of climate change and the need for a multidisciplinary perspective on climate ethics." *Climatic Change,* vol. 130, pp. 327-334. Available: https://doi.org/10.1007/s10584-014-1323-9

[9]   Chandra, G., Michael, S., and Jason, S., 2021. "Introduction climate change and the legal, ethical, and health issues facing healthcare and public health systems." *Journal of Law, Medicine and Ethics,* vol. 48, pp. 122-130.

[10]   IPCC, 2018. "IPCC special report on global warming. Intergovernmental panel on climate change."

[11]   UNFCCC, 2022. "Climate change mitigation and adapatation. United nations framework convention on climate."   Available: https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf

[12]   UNESCO, 2019a. "The ethical principles of climate change. United nations education, scientific and cultural organization." Available: https://www.unesco.org/en/articles/ethical-principles-climate-change

[13] UNESCO, 2019b. "The ethical challenges of climate change. United nations education, scientific and cultural organization." Available: https://www.iau-hesd.net/sites/default/files/documents/370032eng.pdf

[14] José, L. S. G. and Juan, M. D. S., 2018. "Climate change, ethics and sustainability: An innovative approach." *Journal of Innovation and Knowledge,* vol. 3, pp. 70–75. Available: https://doi.org/10.1016/j.jik.2017.12.002

[15] Gardiner, S. M. and Hartzell-Nichols, L., 2012. "Ethics and global climate change." *Nature Education Knowledge,* vol. 3, pp. 5-10.

[16] Allen, M., Opha, D., and William, S., 2019. "Chapter 1: Framing and context", in IPCC." *~,* pp. 49–91.

[17] Caney, S., 2005. "Cosmopolitan justice, responsibility, and global climate change." *Leiden Journal of International Law,* vol. 18, pp. 747–775.

[18] Blomfield, M., 2019. *Global justice, natural resources, and climate change*. Oxford: Oxford University Press.

[19] UNESCO, 2022. "strategy for action on climate change 2018–2021. united nations education, scientific and cultural organization." pp. 112-130. Available: https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/

[20] Gardiner, S. M., 2009. "Ethics and climate change: An introduction." *WIREs Climate Change,* vol. 1, pp. 54-66. Available: https://doi.org/10.1002/wcc.16

[21] Gardiner, S. M., 2004. *Ethics and global climate change*. Yearbook of International Law: Published by Global Climate.

[22] Donald, A. B. and Prue, T., 2015. *Ethics and climate change. A study of national commitments IUCN*. Gland, Switzerland, p. 170.

[23] Jacob, P., Moira, F., and Sneha, G., 2022. "Climate change remains top global threat across 19-country survey." Available: https://www.pewresearch.org/global/2022/08/31/climate-change-remains-top-global-threat-across-19-country-survey/

[24] UNFCCC, 2020. "Climate change. United nations framework convention on climate." Available: https://unfccc.int/resource/ccsites/zimbab/conven/text/art01.htm

[25] UN, 2022. "Climate change and ethical issues." Available: https://unfccc.int/news?gclid=CjwKCAjwtKmaBhBMEiwAyINuwOX_MRRi6HRBUc1knABT7rZRVswnEoIp4FRMZLoXArmKUAkjLjkDMBoCtnAQAvD_BwE

[26] WEF, 2022. "Climate change and ethical issues." *World Economic Forum,* Available: https://www.weforum.org/agenda/2022/09/climate-change-severe-impacts-lives/

[27] United Nations, 2002. "Climate actions." Available: https://www.un.org/en/climatechange/why-2022-will-matter-climate-action-0

[28] Peace, I. O., 2019. "Climate change; a moral issue." *Journal of African Studies and Sustainable Development,* vol. 2, pp. 23-29. Available: https://www.journals.ezenwaohaetorc.org/index.php/JASSD/article/view/620

[29] Adger, W. N., Catherine, B., and Kate, W. S., 2017. "Moral reasoning in adaptation to climate change." *Environmental Politics,* vol. 26, pp. 371-390.

[30] Woods, R., Coen, S., and Fernández, A., 2018. "Moral (DIS)engagement with anthropogenic climate change in online comments on newspaper articles." *Journal Community Applied Social Psychology,* vol. 28, pp. 244-257.

[31] Time, 2022. "Climate change is a moral crisis. But our political system doesn't treat it that way." Available: https://time.com/6201311/climate-change-moral-crisis-politics/

[32] Christopher, L., Cummings, S. H., and Lin, B. D. P., 2017. "Public perceptions of climate geoengineering: A systematic review of the literature." *Climate Research,* vol. 73, pp. 247-264. Available: https://doi.org/10.3354/cr01475

[33] Fawzy, S., Osman, A. I., and Doran, J., 2020. "Strategies for mitigation of climate change: A review." *Environmental Chemistry Letters,* vol. 18, pp. 2069–2094. Available: https://doi.org/10.1007/s10311-020-01059-w

[34] Adedotun, O. A., Akunnaya, P. O., Eziyi, O. I., Hilary, I. O., and Adedeji, O. A., 2020. "climate change adaptation and mitigation strategies in lagos, Nigeria: Built Environment professionals' perspective." *International Journal of Engineering and Advanced Technology,* vol. 9, pp. 1273-1282.

[35] Mahendra, S., Mahesh, K. P., and Bheru, L. K., 2017. "Climate change: Impact, adaptation and mitigation." *A Review, Agricultural Reviews,* vol. 38, pp. 67-71.

[36] Mukhopadhyay, B., 2020. "Why should climate change adaptation and mitigation strategies go hand-in-hand? A comparative case study of vietnam and the USA." pp. 106-121.

[37] Kumar, K., Bhattacharjee, S., Vaikuntapu, P. R., Sharma, C. L., Jayaswal, D., Sharma, R., and Sundaram, R. M., 2020. "Climate change mitigation and adaptation through biotechnological interventions." In *Ch. Srinivasarao et al., (Eds). Climate Change and Indian Agriculture: Challenges and Adaptation Strategies, ICAR-National Academy of Agricultural Research Management, Hyderabad, Telangana, India. 1-22.*

[38] Dai, Z., Burns, E. T., and Irvine, P. J., 2021. "Elicitation of us and chinese expert judgments show consistent views on solar geo-engineering." *Humanity Social Science and Communication,* vol. 8, pp. 18-29.

[39] Parker, A. and Peter, I., 2018. "The risk of termination shock from solar geoengineering." *Earth's Future,* vol. 6, pp. 456-467.

[40]   Horton, J. B., 2018. "Parametric insurance as an alternative to liability for compensating climate harms." *Carbon and Climate Law Review,* vol. 12, pp. 285-296.

[41]   Tyler, F., Joshua, H., and David, K., 2022. "Solar geo-engineering research on the u.S. Policy agenda: When might its time come? ." *Environmental Politics,* vol. 31, pp. 498-518.

[42]   Fan, Y., Tjiputra, J., and Muri, H., 2021. "Solar geo-engineering can alleviate climate change pressures on crop yields." *National Food,* vol. 2, pp. 373–381. Available: https://doi.org/10.1038/s43016-021-00278-w

[43]   Horton, J. B. and Barbara, B. K., 2020. "Steering and influence in transnational climate governance: Nonstate engagement in solar geoengineering research." *Global Environmental Politics,* vol. 20, pp. 93-111.

[44]   Lutsko, N. J., Jacob, T. S., and David, W. K., 2020. "Estimating impacts and trade-offs in solar geoengineering scenarios with a moist energy balance model." *Geophysical Research Letters,* vol. 47, pp. 181-197.

[45]   Heyen, D. J. H. and Juan, M. C., 2019. "Strategic implications of counter-geoengineering: Clash or cooperation? ." *Journal of Environmental Economics and Management,* vol. 95, pp. 153-177.