THREATS OF GLOBAL CLIMATE CHANGE: A REVIEW OF THE DRIVER TO MULTIPLES ENVIRONMENTAL DEGRADATION, HUMAN RIGHT INJUSTICE AND UNSUSTAINABLE DEVELOPMENT

Abstract: As we embrace the new millennium of the 21st century, the threats to the environment are unprecedented. However, none of these threats is as immense as global warming. Environmental management and conservation actions are floundering in the face of climate change as the latter poses a complex, bewildering array of impacts to the environment particularly on the state, individuals, communities, and cultures, as well as on natural resources (land, water, and air). Because of this, there is the need for the protection and promotion of climate change justice. The problem facing policy-makers and environmental stakeholders is how to plan within the context of global warming and to implement strategies for increasing the resistance and resilience of the environment to climate change impacts. This is because climate change is an issue of reality and is seemingly difficult to understand and to be a plan for. It is, therefore, vital that a justice-centered approach is adopted to combat climate change. This article, therefore, seeks to analyze the causes and impacts of climate change, designs strategies and recommendations which is hope to address the adverse effects of climate change on human rights and the environment.

Key-Words: Global Climate Change**;** Environmental Degradation**;** Injustice**;** Human Rights**;** Unsustainable Development**;** Protection**.**

I. INTRODUCTION

The environment consists of all the natural and artificial elements and biogeochemical balances they participate in, as well as the economic, social and cultural factors which are conducive to the existence, transformation and development of the environment, living organism and human activities. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate, which is attributable directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over a comparable time periods, prevailing over specific location, region or the entire planet. It is evident from both definitions that change is an inherent attribute of climate. Considering the fact that climate change has no boundary, the paper is prefaced by a comment made in 1998 by President Bill Clinton that *"Global warming is real; the risks it poses are real, and the American people have a right to know it and a responsibility to do something about it. The sooner Congress understands that, the sooner we can protect our nation and our planet from an increased flood, fire, drought and deadly heat waves"*. This statement is a mere underscoring of the global warming phenomenon and the danger it poses by confining it to only the American people. This is because global warming affects not only the Americans but all the inhabitants of our dear planet – the earth. The natural environment provides human beings and the communities in which we live with the resources we need to achieve lives of dignity and well-being clean air to breathe; clean water to drink; food to eat; fuels for energy; protection from storms, floods, fires and drought; climate regulation and disease control; and places to congregate for aesthetic, recreational and spiritual enjoyment, and in a null shell sustainable development. These environmental endowments often referred to as ecosystem services are at once essential to core survival and vital to human flourishing. As the nations of the world declared in *The Future We Want*, the outcome document of the 2012 Rio+20 conference, sustainable development requires that we angle toward "harmony with nature." To achieve this idea, we must balance economic, social and human development with "ecosystem conservation, regeneration, restoration and resilience in the face of new and emerging challenges.

International scholars hold that 'all states must believe themselves better off by their rights as a result of the climate treaty. While developed nations have historically emitted far more greenhouse gases than developing nations, the effects of global climate change are predicted to be felt most severely by poor, developing nations. Two primary reasons developing countries will be disproportionately affected by climate change. First, developing nations may simply be exposed to more damaging changes in climate as a result of their location on the globe. Second, their relative lack of infrastructure, technology, and governance institutions may make it more difficult for developing countries to adapt to changes in climate. Thus, the nations that are likely to see the most significant impacts of climate change may also be the least prepared to cope with the consequences of these changes.

The need for justice in climate change issues is justified both by the magnitude and consequence of climate change. This pushed the international community to develop some justice principles of responsibility for climate change mitigation and adaptation. These principles include inter-alia polluter pay principle, Precautionary principle, the preventive principle, the 'no-harm rule and the Principle of Intergenerational equity. Over the course of the last decade, the international community has arrived at a clear consensus on all of these issues. While United Nations agencies and national governments have explicitly acknowledged that climate change and responses to climate change can impair human rights, there has been less agreement on the corresponding obligations of governments and private actors to address this problem. The purpose of this article is to inform the decisions undertaken by the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) at COP-21, as well as other activities undertaken by governments and private actors, by providing an up-to-date assessment of the relationship between climate change and human rights laws and the environment, and by making recommendations for incorporating a human rights lens into international and domestic climate action. Also, this article examines how vulnerable the planet is to the on-going climate change since states may not have much idea about how vulnerable the planet is to climate change. So it is the in-depth study of the causes and impacts of climate change that can reveal the system's sensitivity, and the awareness of planners, policy and decision makers on how to combat climate change on the environment, as a result, ensure a sustainable environment and the protection of human rights amongst states.

II. CAUSES AND SCIENCE OF GLOBAL CLIMATE CHANGE

Climate change is caused by both human activities (anthropogenic) and natural factors. Human activities are changing the global climate; with unpredictable and potentially profound consequence for global weather pattern, ecosystem and human health. These activities constitute injustice to human rights and the environment. Apart from these factors, the science of climate change is inevitable to the transformation of the entire planet.

A. Anthropogenic Causes

Anthropogenic climate change is the most significant, most pervasive threat to the natural environment and human rights of our time. There is a natural carbon cycle by which atmospheric CO2 eventually returns to the Earth's surface, by means either of oceanic absorption or plant respiration. Atmospheric concentrations of CO2 increase when humans emit at a rate faster than the natural processes such as forest can recycle. The rising emission of GHG is as a result of burning coal, oil and gas, deforestation and bush burning which produces carbon dioxide and nitrous oxide. Increasing livestock farming, Cows and sheep produce large amounts of methane when they digest their food and the use of fertilizers containing nitrogen produce nitrous oxide emissions. Note that Carbon dioxide CO_2 is responsible for 64% of the man-made global warming, methane is responsible for 17% of

man-made global warming, and nitrous oxide is responsible for 6% of human-made global warming approximately of about 87%, all due to human activities. Anthropogenic climate change is a global process affecting the lives and well-being of millions of people now and countless number of people in the future. From the beginning of the industrial revolution to the present, humanity has emitted approximately 579,500,000 tons of carbon. To have a better than 66 percent chance of limiting warming to 2°C, total human emissions must not exceed one trillion tons of carbon. The human factors that cause climate change have been identified as industrialization, technological development, urbanization, and deforestation and burning of fossil among others, while the natural factors include variability of solar radiation quality and quantity, an astronomical position of the earth. Unsustainable industrialization, which releases greenhouse gases, is viewed as the primary cause. Other contributing factors are urbanization, deforestation, burning of fossil fuel and water pollution. These factors have been observed to alter the climatic conditions of different parts of the world resulting in global warming and devastating extreme weather conditions in the earth. The severe weather conditions include global warming, drought, desertification, flood, sea level rise, wind, rainstorm and thunderstorm among others. Thus, the warming trend from the late 1880s to the mid-1940s has been attributed to the effect of CO2 produced by industrialization following the industrial revolution of the late 19th century. In contrast, the cooling trend from the 1940s to the 1960s was attributed to the cooling effect of aerosols, also produced by industrialization. The global warming since the 1970s has been ascribed to the increasing emission of CO2, methane, and nitrous oxide by various human activities such as the burning of fossil fuel, deforestation, bush burning and other anthropogenic resources.

B. Natural Causes

The view of the proponents of natural causes of any warming that might have taken place is based on the following premises:

- Warming has been occurring before man-made emissions of greenhouse gases could have had any effects.
- The earth's climate had in the past moved from periods of warm to cold and back again without any man-made activities. For example, the earth was warmer than it is now between 900 and 1300 A.D (the medieval climate optimum) and colder between 1400 and 1800 A.D (the Little Ice Age). These large swings in the earth's temperature and others in the past occurred without the impact of man.
- Many solar scientists have shown in their recent research that there is a clear linkage between changes in solar activity and global climate and that solar activity is, in fact, the dominant factor in global climate dynamics. The solar effect on global climate can be amplified by various factors notably changes in stratospheric ozone and circulatory effects and changes in atmospheric ionization by Galactic Cosmic Rays which are not man-made activities.

C. Science of Global Climate Change

Certain gases such as carbon dioxide, methane, nitrous oxide and water vapor, form an insulating blanket around the earth. These gases allow in energy provided by the sun to warms the earth. Then in turn the isolating gases prevent the warmth from escaping. This effect is what makes the planet habitable. Without it, the earth will be frozen. The problem here is that if these gases become concentrated they work for the well keeping in of too much heat. But this concentration should not be more than what the atmosphere can absorb. Since the beginning of the Industrial Revolution in the mid-1700s, human activities have added more and more of these gases into the atmosphere more quickly than they can be absorbed by natural sinks such as forests. As a result, the climate is transforming before our eyes: 'the atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea levels

have risen, and the concentrations of GHGs have increased and consequently affects underground water.'

III. EFFECTS OF GLOBAL CLIMATE CHANGE ON ENVIRONMENT AND HUMAN RIGHTS

Climate change poses an enormous threat to the lives and well-being of individuals and communities across the world. The Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report (AR5) provides a detailed picture of how the observed and predicted climactic changes will adversely affect millions of people and the ecosystems, natural resources, and physical infrastructure upon which they depend. Most or all of the rights enumerated in the Universal Declaration of Human Rights (UDHR), constitute customary international law, and as such, they are binding on all states regardless of treaty ratification status. As the climate changes, the environmental impact will unquestionably jeopardize three fundamental human rights: The right to life, the right to health and the right to subsistence. Two key events sparked a searching international dialogue on human rights and climate change. First, in December 2005, the Chair of the Inuit Circumpolar Conference (ICC) submitted a petition to the Inter-American Commission on Human Rights (IACHR) requesting relief for human rights violations resulting from the impacts of global warming and climate change. The petition specifically alleged that the United States-the largest cumulative emitter of greenhouse gas (GHG) emissions to date had violated the Inuit's human rights by failing to adopt adequate GHG controls. Although the IACHR never issued a decision, the petition did succeed in drawing public attention to the severe effects of global warming on the Inuit and sparking further dialogue about the human rights implications of climate change.

A. Effects on Ecosystems and Natural Resources

Global warming produces high risks of severe negative effects, including widespread loss of species and eco-systemic destruction, heat waves, extreme precipitation, and large and irreversible sea-level rise from ice sheet loss. Climate change is already contributing to drought, ecosystem degradation, and food shortages across the world Natural resources here involve freshwater resources, terrestrial ecosystems, coastal systems and low-lying areas, ocean systems, food security and production systems.

i. Freshwater resources

According to IPCC projections, climate change will significantly reduce surface water and groundwater resources in most dry subtropical regions, thus intensifying competition for water among agriculture, ecosystems, settlements, industry, and energy production, and affecting regional water, energy, and food security. Climate change will also increase the frequency of droughts in presently dry areas. The primary drivers of these projected water shortages and droughts include reduced rainfall, reduced snowpack, resulting in less snowmelt supplying rivers and streams; higher temperatures, which increase evaporation from surface water and soils; and sea level rise, which contributes to saltwater inundation of freshwater resources. This can lead to the degradation of water supplies for human consumption; agriculture hence, affects right to water and sanitation, right to health, right to life, right to food and right to an adequate standard of living.

ii. Terrestrial Ecosystems

Even under the intermediate emissions scenarios there is a "high risk" that climate change will cause "abrupt and irreversible regional-scale change in the composition, structure, and function of terrestrial and freshwater ecosystems" in this century. Many plant and animal species have already moved their ranges and changed their behavior in response to observed climate change over recent decades, but many others will be unable to move quickly enough or otherwise adapt to changing climatic conditions. Thus, the IPCC predicts that climate

change will "reduce the populations, vigor, and viability" of many species, especially those with spatially restricted populations, and will increase the extinction risk for many species. Also; increased tree death has been observed in many places worldwide, and there is high confidence that this can be attributed to climate change in some regions. “Forest dieback” is a major environmental risk, which has potentially significant impacts on biodiversity, water quality, wood production, and livelihoods. The drivers of tree death include high temperatures and drought, and changes in the abundance of insect pests and pathogens related, in part, to warming. The aftermath is violation to the right to food, right to an adequate standard of living, right to health.

iii. Coastal Systems and Low-lying Areas

The IPCC projects that coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, severe rain storms, tropical cyclones and heat waves, flooding, erosion, and saltwater intrusion, primarily due to rise in sea level, although increased precipitation and storm surges will also contribute to these impacts. The physical composition of coastal and estuarine ecosystems will be altered by changes in precipitation and river flow, increased water temperatures, and ocean acidification, and this will contribute to a decline in biodiversity and ecosystem productivity along coastlines and often lead to displacement of local people and the destruction of ecosystems upon which they depend, and can also harm the health and livelihoods of people living downstream. Some regions are hit harder than others, with more clearly attributable linkages to climate change for example, sea level rise has adversely affected the safety and livelihoods of many coastal inhabitants, and rising temperatures are causing significant changes in the Arctic ecosystems that support many indigenous communities, and rising temperatures are causing significant changes in the Arctic ecosystems that support many indigenous communities. Thus, affect right to life, right to health, right to housing, right to an adequate standard of living, right to food, right to water, right to property, right to self-determination.

iv. Ocean system

Climate change is altering the physical, chemical, and biological properties of the ocean; scientists have already observed large-scale distribution shifts of species and altered ecosystem composition as a result of ocean warming (e.g., the distribution of many fish and invertebrates have shifted pole ward and/or to deeper, cooler waters). The IPCC thus predicts that, in response to further warming by 1°C or more, there will be large, irreversible shifts in the spatial distribution of species and seasonal timing of their activities (feeding, growth, development, behaviors, and productivity), which will have implications on biodiversity. Hence, affecting the right to food, right to an adequate standard of living, right to health.

v. Agriculture and Food Security

The effects of climate change on crop and terrestrial food production are already evident in several regions of the world. Some high-latitude regions such as northeast China and the U.K. have experienced a modest increase in productivity as a result of recent warming trends. Agricultural production and land use may be affected in diverse ways by global warming. The increase in CO2 content of the atmosphere largely considered to be the primary cause of global warming will have impact on agricultural production. Similarly, the increase in air temperature and consequent increase in rates of evapo-transpiration will also affect agricultural productivity directly and indirectly. There would be an increase in the risk of crop failure as a result of higher frequencies of drought, flood, storms and other weather hazards to agriculture. A rise in sea level that would result from continued global warning will also affect agriculture adversely especially in coastal and deltaic areas. The outcomes of these effects are the sharp reduction in crop yield which will lead to hunger and starvation. So, the aim of halving extreme poverty and hunger which is the first of the eight goals of the

Millennium Development Goals (MDGs) is at stake if global warming should continue unabated. In order to account for the fact that nations with a greater reliance on agriculture will be more severely affected by climate change, we included the percent contribution of agriculture to each nation's GDP. As a result of this, it has affected right to food, right to health, right to life, right to an adequate standard of living.

B. Effects on Physical Infrastructure and Human Settlements

Human settlements will be affected directly and indirectly by global warming and climate change. The rights to free enjoyment of culture and minority rights are at risk due to climate change. These cultural rights are especially threatened where the population at issue has developed around a close relationship to the natural world, as is the case with indigenous populations. As climate change forces cultures to adapt to a changing environment rather than respect their longstanding traditions or norms, important parts of group historical and cultural background will be lost. Therefore, all plans to ensure environmental sustainability may not materialize in urban and rural areas if emissions and concentration of greenhouse gases (GHG) in our atmosphere continued unabated, hence affect the right to human security, and can also contribute to political instability and violent conflict.

i. Urban Areas

Climate-related phenomena such as rising sea levels, coastal storms, heat stress, extreme precipitation, inland and coastal flooding, landslides, drought, increased aridity, water scarcity, and air pollution "will have profound impacts on a broad spectrum of city functions, infrastructures, and services and may exacerbate many existing stresses."Urban climate change-related risks are increasing, with widespread negative impacts on people and their health, livelihoods, and assets, as well as local and national economies and ecosystems. These risks are amplified for those who live in informal settlements and hazardous areas, which often lack essential infrastructure and adaptive capacity, as well as individuals that are more vulnerable as a result of age, income, disability, or other factors hence, Affecting the right to life, right to housing, right to health, right to water and sanitation, right to an adequate standard of living, right to property.

ii. Rural Areas

Climate change will affect water supply, food security, and agricultural incomes in rural areas. This will have implications on human health, livelihoods, incomes, and migration patterns. Some of the key impacts that create risk for rural communities include: rising temperatures and heat waves, changing precipitation patterns, and extreme weather events, and the corresponding impacts on human health, water supply, ecosystems, natural resources, crops, and physical structures. Increase in the sea level will lead to shoreline erosion and threaten the very existence of coastal communities. Rural areas are also uniquely vulnerable to the effects of climate change due to a greater dependence on agriculture and natural resources, such as fisheries and forests; and existing vulnerabilities caused by poverty, lower levels of education, physical isolation.

iii. Key Economic Sectors and Services

Climate change will affect a variety of economic sectors and services, including energy, water services, transport, agriculture and livestock, forestry, fisheries, mining, tourism, and insurance. Food production systems, water supply systems, and other sectors and services that rely on natural resources in their supply chain are particularly vulnerable to the impacts of climate change. Electricity systems will also be affected, both through direct climactic impacts (e.g., higher temperatures, lower water supply) and through increased demand for electricity, both of which can compromise electric grid reliability. Hence, affects the right to health, right to an adequate standard of living, right to food, right to water.

C. Effects on Livelihoods, Health, and Security

Global warming produces high risks of severe negative effects on Livelihoods, Health, food and human security.

i. Livelihoods and Poverty

Climate-related hazards, including gradual changes and extreme weather events, will affect peoples' livelihoods directly through impacts such as losses in crop yields; the destruction of natural resources, homes, and properties; and displacement. They will also have indirect effects on livelihoods by exacerbating other stressors. For example, climate change can contribute to: (i) increases in the prices of food, energy, and other critical commodities; (ii) political instability and large-scale conflict; and (iii) individual and household-level disturbances. Poverty, political instability, and conflict also undermine the ability of individuals and communities to adapt to climate change (e.g., by fortifying their physical assets or by moving to less vulnerable locations). Thus, climate change is one of many factors that can perpetuate a vicious cycle of poverty, deprivation, and inequality. Affected rights: right to an adequate standard of living, right to health, right to life, right to food, right to water, right to property. Increased risks for food production potentially leading to higher malnutrition rates. Children face stunted growth and health problems due to malnutrition or forced migrant status.

ii. Human Health and Disease

There is evidence that climate change has already contributed to health problems in some regions, and if climate change continues as projected under various scenarios, the major health impacts will include: (i) greater risk of injury, disease, and death due to more intense heat waves and frees; (ii) increased risk of under-nutrition resulting from diminished food production in poor regions; (iii) health consequences stemming from lost work capacity and reduced labor productivity in vulnerable populations; and (iv) increased risk of food-, water- and vector-borne diseases. In some regions, the combined effects of higher average temperatures and higher humidity will also create significant health risks (especially those regions that already exceed the international standard for safe work activity during the hottest months of the year). Heat related disorders include skin rashes, prickly heat, heat exhaustion and heat stroke. Climate change will result in increased exposure to countless illnesses, from cardiovascular disease to psychological harm created by destabilization or displacement. Salt depletion which occurs under hot conditions often manifests in cramps, fatigue and anorexia. Although there may be some positive health impacts, these will be increasingly outweighed by the magnitude and severity of negative health effects which have affected right to health, right to life. According to a United Nations Human Development Programmed (UNDP) review of climate change projections, 'Overall, climate change will lower the incomes and reduce the opportunities of vulnerable populations. By 2080, the number of people at risk of hunger could reach 600 million twice the number of people living in poverty in sub-Saharan Africa today.'

iii. Human Security

Climate change will threaten human security by increasing the scarcity of key resources (e.g., water, food, land, and other natural resources), undermining livelihoods, compromising culture and identity, increasing displacement and migration, and challenging the ability of states to provide the conditions necessary for human security. Each of these impacts can directly affect human security, and can also contribute to political instability and violent conflict. Affected rights: right to life, right to an adequate standard of living, right to a nationality, right to self determination, right to mobility, right to property.

D. The Effects on States

In certain low-lying or island areas, disappearing land may mean that a nation's entire territory will vanish. This poses unprecedented questions about the nature of citizenship, and raises issues as to how the world will respond to future forced displacement and migration.

States will increasingly need to deal with internal migration, food shortages and disaster events caused or aggravated by climate change. While the full scale of the challenge is becoming increasingly clear, many of these effects have been acknowledged for the last 30 years. The Intergovernmental Panel on Climate Change (IPCC), which represents the consensus of hundreds of prominent climate researchers, agrees that developing regions (states) are more vulnerable to climate change. The IPCC's most recent report, issued in 2007, notes that ''there are sharp differences across regions (states) and those in the weakest economic position are often the most vulnerable to climate change.' In addition, as cities and nations are threatened with loss of their territory due to rising sea levels or natural disasters, civil and political rights will be affected as well. The international community may soon be faced with the problem of people potentially being rendered stateless when their territory vanishes beneath the rising ocean.

Fig 1: Inland Flooding in local communities as a result of climate change variability. This creates negative effects on the local communities as they are force to be displaced from their ancestral origins.

Fig 2: Visibility study of CO2 emissions in the atmosphere from industries in developed country of Great Britain.

Fig 3: Occurrence of Droughts on arid regions as a result of climate change variability.

Fig 4: poor agricultural harvests as a result of climate change impacts on farmlands.

The above discussed causes and impacts of climate change clearly show that there is a problem in the planet. Since the law is out to render justice, it can therefore not be indifferent in the face of these injustices. Therefore legal and financial climate mechanisms are crucial to address the "super wicked" effects (shocks) of climate change on the entire planet.

IV. MECHANISMS TO COMBAT EFFECTS OF GLOBAL CLIMATE CHANGE

The international community has taken major steps, both individually and jointly, to address the causes and impacts of climate change on the environment. Nonetheless, OHCHR(Office of the United Nations High Commissioner for Human Rights) concluded that states have a duty to address the effects of climate change on the environment by taken measures regardless of whether the state has contributed to climate change in a manner which gives rise to specific human rights violations. There is evidence that, as a general matter, many states have taken important steps towards promoting public participation in environmental decision-making. This appears to be the case for climate-related decisions as well. For example, one study found that many European countries have mechanisms in place to ensure that affected stakeholders are informed about climate-related decisions and that they can provide input on those decisions.

A. Climate Finance Mechanisms

Many projects have been funded through the UNFCCC Clean Development Mechanism (CDM) and other climate finance mechanisms. This section provides a brief history of how UNFCCC and national governments have come to understand the relationship between climate change and human rights.

i. REDD/REDD+

Concerns have also been raised about the potential effect of the Reducing Emissions from Deforestation and Forest Degradation (REDD/REDD+) program on indigenous groups and local stakeholder. The IPCC's Fifth Assessment Report confirmed that, to have a «likely" chance of limiting warming to 2°C, we must see "substantial emissions reductions over the next few decades, and near zero emissions… by the end of the century The "emissions gap" (the gap between the aggregate effect of actions and commitments by parties to the UNFCCC and the emissions reductions) required to keep warming at or below 2°C. Many countries dispute whether the 2°C is really adequate to prevent "dangerous anthropogenic interference" with the atmosphere and the natural systems that support human life. In the 2009 Copenhagen Accord, developed countries committed to a goal of mobilizing US$100 billion per year by 2020 to "address the needs of developing countries" in the context of "meaningful mitigation actions and transparency on implementation. This commitment was reaffirmed in the 2010 Cancun Agreements. The Cancun Agreements also called for the creation of a Green Climate

Fund (GCF), with the stated objective of achieving a balanced allocation between adaptation and mitigation. The Cancun Agreements included a set of safeguards that serve as guidance for forest activities aimed at mitigating climate change. In its infancy, REDD was first and foremost focused on reducing emissions from deforestation and forest degradation. These standards provide a more comprehensive framework for protecting the rights of indigenous peoples and other local stakeholders, and ensuring an equitable distribution of benefits from REDD+ projects, but they are not binding on member states or other project stakeholders. With the addition of new components which includes the Conservation of forest carbon stocks, Sustainable management of forests and Enhancement of forest carbon stocks, REDD became REDD+ to reflect these new components. The UN REDD+ recognizes this important role of forest in climate change mitigation and provides incentives for developing countries to conserve and sustainably manage their forests and enhancement of forest carbon stocks.

ii. UNFCCC Clean Development Mechanism (CDM)

The CDM was established to encourage funding for carbon reduction projects in developing countries. CDM allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol to implement an emission-reduction project in developing countries which can be counted towards meeting Kyoto targets. The CDM accounts for more than 7,300 projects to date, and in 2012 it was estimated to have generated approximately US$215bn for developing countries. However, there has been widespread criticism of the CDM, in that the CDM has failed to effectively safeguard human rights. It does not have any safeguards to prevent the registration of projects that are linked to human rights abuses, such as displacement of communities. For example, the Aguan Biogas project in Honduras (country in Central America) funded in part through the CDM resulted in human rights violations against farmers in the region. But stakeholders have been unable to stop the project because the CDM does not contain any requirements that its funds should not be used in projects that cause human rights violations. Although the UNFCCC has recognized that 'parties should, in all climate change-related actions, fully respect human rights', there are as yet no practical mechanisms to ensure accountability.

iii. Emissions Trading

Emissions trading are another climate mitigation area which raises justice concerns.
The Kyoto Protocol, the only agreement far to reduce global GHG emissions is widely seen as somewhere between troubled and terminal. Emissions' trading was established under the Kyoto Protocol and has long been viewed as a key element of a global climate agreement, by allowing entities to trade emissions allocations within domestic and/or international markets under an all-embracing cover of GHG emissions. Today, there is no global carbon market but rather dispersed emissions trading systems at national and regional levels which present justice issues. Emission trading allows industrialized countries and companies to continue polluting and to avoid their emissions reduction targets. Climate mitigation schemes can be rendered more justifiable by integrating human rights concerns. This is represented scientifically:

Emission Trading =x
Climate Change =a

$$(x+a)^n = \sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k}$$

The positive result of balancing emission trading with climate change is equal to a^n-k as demonstrated above.

iv. Justice of the Distribution of Emissions Entitlements

If the capacity of the atmosphere to recycle carbon is a good owned in common by all humanity, then according to one argument, past appropriation of that good by means of

emitting establishes an entitlement for continued use on the basis of something like the property doctrine of adverse possession. Rather than establishing emissions entitlements against a baseline of recent emissions, an alternative principle would require across the board equalization of the burden of mitigation. The burden that a state bears for an equal unit of cost may vary inversely with how wealthy the state is. Equalizing the burden of reducing emissions then would not result in equal amounts reduced per state. Rather, equalizing burdens would equalize the marginal disutility of reductions. The principal problem with this view is that it fails to allow over medium term, reductions in emissions of any amount at all might be inconsistent with economic development in states with very large populations of very poor people. Consider the principle that the entitlement to emit CO2 should be distributed to states on an equal per capita basis. A principle requiring equal per capita emissions is controversial. Simon Caney makes three criticisms of it. First, it fetishizes emissions. Egalitarian concern should be about persons or their well-being, but not about emissions. Second, it is insensitive different human needs, the satisfaction of which might require differential emissions. Third, it is implausibly indifferent to past emissions. The problem with equalizing per capita emissions is that it could require emissions reductions in developing countries that would slow poverty eradication and therefore not sufficiently improve on the problems of equalizing burdens. If there is a justified concern that climate change mitigation should not prolong poverty, and should be consistent with human development in poor countries, then equalizing per capita emissions appears to be an oblique way to safeguard it. A more direct way to address the need to permit human development is simply to affirm a principle recognizing the right to sustainable development. The Preamble to the United Nations Framework Convention on Climate Change affirms the importance of the right to sustainable development. Reconciling increased energy consumption needed for poverty eradicating development and climate change mitigation would require developed states either to make emissions reductions sufficient to offset emissions growth in states that are developing or to subsidize the use of renewable energy in these states so that increased energy costs do not slow economic growth. This state-centric approach is criticized by some as sheltering the emissions of rich people in poor states.

v. Global Environment Facility

The GEF is the oldest UNFCCC financial mechanism, and it manages two additional funds established by the conference of parties (COP): the Special Climate Change Fund (SCCF) and the Least Developed Country Fund (LDCF). In 2011, the GEF Council has also approved its own set of Policies on Environmental and Social Safeguards and Gender Mainstreaming. The environmental and social safeguards are similar to the World Bank safeguards. They require an initial screening for environmental and social impacts, and outline various substantive requirements for the protection of natural habitats, avoiding and minimizing involuntary resettlement, protecting the rights of indigenous people, pest management, the protection of physical cultural resources, and dam safety. Apart from the requirements for consulting with and respecting the rights of indigenous peoples, the public participation provisions are very weak. The social and environmental policy also lacks provisions to address adverse or disproportionate impacts on vulnerable or marginalized groups.

B. Legal Mechanisms

There are many international instruments both hard and soft laws as well as municipal laws which either indirectly or directly deals with issues related to climate change. The main instrument is the UNFCCC and its subsequent agreements such as Kyoto Protocol, International Panel on climate change and the Paris Agreement while the municipal laws depend on the individual state. For example in Cameroon we have the Constitution, Environmental, and Forestry law. These instruments are binding and implemented by states through mitigation and adaptation to reduce GHG emissions.

i. Justice Implications of mitigation

Mitigation refers to measures taken to limit GHGs, either by reducing their sources or by enhancing the planet's capacity to absorb them, to reduce impact of further climate change. The "emissions gap" (the gap between the aggregate effect of actions and commitments by parties to the UNFCCC and the emissions reductions) required to keep warming at or below 2°C is a major concern from a human rights perspective. The parties have significantly increased their mitigation ambition in the lead-up to the Paris Agreement. But there is more to be done. Moreover, many countries dispute whether the 2°C is adequate to prevent "dangerous anthropogenic interference" with the atmosphere and the natural systems that support human life. Nevertheless, on a more general level, there are concerns about the distributional consequences of mitigation policies. Carbon pricing schemes, for example, can have a disproportionate effect on indigenous peoples, the poor, and other vulnerable groups, who may suffer greater hardship due to the increased price of energy, fuel, and goods. Some commentators have also suggested that the commoditization of carbon emissions rights will contribute to, rather than alleviate, existing economic disparities between and within countries. Also, Hydroelectric projects, which often lead to displacement of local people and the destruction of ecosystems upon which they depend, and can also harm the health and livelihoods of people living downstream from the project by reducing river flows.

ii. Justice Implications of Adaptation

Climate change adaptation refers to the responses to both the adverse and positive effects of climate change. Adaptation is any adjustment made whether passive, reactive, or anticipatory in response to anticipated or actual consequences of climate change. Adaptation measures will be needed to determine where and how displaced persons can be relocated. Adaptation policies require no evidence of climate change harm; merely evidence of vulnerability, in order to be prima facie justified by the risk reduction principle. 'Development itself is the way to strengthen a society's ability to adapt.' In that case, poor people vulnerable to climate change have a claim to development resources as a matter of vulnerability reduction. Likewise, human security, food security and the realization of the right to food will be adversely affected by climate change, and lead to other complicated adaptation issues that need global solutions. Although there is a well-established consensus that adaptation measures need to be utilized, it is unclear who will pay for them and how governments will trade-off adaptation goals with other societal needs. The UNFCCC requires wealthier nations to provide 'new and additional funding' to poorer counties to allow them to manage climate change, but the provision has not had a meaningful practical impact. The paper therefore suggests six types of strategies for adapting to the effects of climatic changes as identified and recommended by Carter et al(1994). These are prima facie Prevention of Loss by taken measures to reduce exposure units that is, activity, group, region or resource exposed to the effects of climate change; Tolerating Loss (Losses may be tolerated where adverse impacts can be accepted in short-term because they may be absorbed by the exposure unit without long term damage); spreading or sharing Loss (Here actions are taken to redistribute the burden of the impacts of climate change over a larger region or population beyond those directly affected); Changing Use or activity (This involves a change in activity or source use to adjust to the adverse as well as the positive effects of climate change. For example, there could be a switch from cultivation of water-demanding crops to crops that are less water demanding. For example, millet may be grown instead of guinea corn or maize); changing location (An activity is relocated to a more suitable location under the changed climate. For example a hydro-electric facility may be relocated due to a change in water availability. Also, a settlement of industrial plant may be relocated to avoid inundation by a rise in sea level as a result of climate change); Restoration (Here, the aim is to restore an exposure unit to its

original state following damage or modification as result of climate change. A good example is the restoration of a building or an historical monument that is susceptible to flood damage).

However, adaptation strategies are complicated, serious and costly for developing countries with already limited technological and financial resources. Also, projects implementation to combat the effects of climate change poses adverse effects on the environment. For example, Geoengineering causes deliberate and large-scale manipulation of natural systems through measures aimed at preventing or mitigating the effects of climate change, such as solar radiation management and ocean iron fertilization. Although there have not yet been any significant field tests of geoengineering technology, far less any large-scale geoengineering projects, it is important to note that such projects could seriously interfere with the enjoyment of human rights for millions and perhaps billions of people. For example, one recent study of five potential geoengineering methods deployed in high GHG emissions scenarios concluded that these methods could severely disrupt ocean and terrestrial ecosystem. These disruptive effects could undermine the provision of ecosystem goods and services, thus interfering with access to food, clean water, and other key resources. Another study found that proposals for solar radiation management would cause widespread regional-scale changes in precipitation. Such shifts could lead to increases in storms and flooding in some areas and drought in others, with adverse impacts on natural ecosystems and human settlements.

V. RECOMMENDATIONS

This article will be concluded by making some suggestions on the way forward in respect of coping with both the current and future challenges of global warming and associated climate change impacts, to ensure the effective protection of the environment. Therefore, a synthesis of what we currently know about global warming and its challenges will not be comprehensive without making suggestions on the way forward as aimed by this article. Thus, in order to achieve climate change justice it is imperative to recognize climate change victims; States should adopt a model statute on legal remedies to those directly affected by climate change; reinforce and develop human rights laws with a basis on climate change policies; beef up international institutions such as international court of justice to manage environmental issues since, states rarely refer environmental disputes to the International Court of Justice (ICJ); the weather and climate institutions of Cameroon, research institutes and universities should be updated by installing more conventional and upper air stations so that their capacity for generating climatic data will be enhanced. This is necessary for climate projections and the sustainable management of natural systems. Lastly, forests should be conserved n sustainably managed since, forests act as carbon sinks and carbon reservoirs. It is critical that as the world endeavors to address the "super wicked" problem of climate change it do so with full respect for human rights. Hopefully, policy makers at the national and sub-national level will be able to incorporate the findings of this investigations into their strategic plans designed to advance sustainable management of the environment and consequently, protect human rights.

VI. CONCLUSION

Understanding the science of climate change, its effect and the human rights implications requires a full appreciation of the impact of climate change mitigation and adaptation policies. It informs policy-making by illustrating the true harms of climate change: harms felt in populations of every size across every continent. As the environment changes, it forces those who are dependent upon it to change as well and, where change is not possible, there have been and will be pressures in turn at every level of human society raising justice concerns. However, it appears that there is still a need to mainstream environmental

considerations into the decisions of individual countries, the COP and the UNFCCC's various arms and mechanisms, and to undertake additional measures to address the effect of climate change on the environment. Thus, the recommendations which are made shall be of great help to protect the environment.

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