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Right-Based Approach and Climate Justice

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ABSTRACT

This research paper takes up the issue of climate change debate and tries to link it with human rights and morality. This will help analyze and steer climate policy measures from moral stand-point. There are hidden ethical dilemmas in climate crisis debate which needs to be answered. The present climate diplomacy is not going in this direction and therefore no concrete results are see on paper as well as in practice. The reports of Intergovernmental Panel on Climate Change (hereinafter IPCC) which are treated as "gold standards" for climate policymakers have been lacking in depicting the "known unknown" and "unknown unknown" effects of climate change. Apart from that, the solutions presently offered are satisfy neither morality angle nor provide basic human rights to all.

Keywords: *Anthropocene, Climate Justice, Fossil Capitalism, Known Unknown, Unknown Unknown.*

I. CLIMATE CHANGE – A SOCIAL JUSTICE CONUNDRUM[2]

The titles of prominent reports like "Our Common Future"[3], "Back to Our Common Future"[4] and "The Future We Want"[5] demonstrate the fact that present human race face threat to greatest common it has i.e. 'our endangered planet'. Studies such as:- in 2009 International Scientific Congress on Climate Change[6] made a finding that that global net yields of stable food crops are declining steadily in direct proportion to increase in global temperature; IPCC in 2014[7] also highlighted that if global warming continues at current rate then humanity will cross critical

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[2] An issue becomes social justice conundrum when it has following attributes: 1) That affects fundamental interests of society; 2) Requires a collective solution from the society; 3) Involves the distribution of benefits and burdens amongst society; 4) Requires the regulation of not only individual actions but also of institutions concerned.

[3] World Commission on Environment and Development, *Our Common Future* (1987), available at: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

[4] United Nation Department of Economic and Social Affairs (hereinafter UNDESA), *Back to Our Common Future: Sustainable Development in the 21st Century (SD 21) Project Summary* (2012), http://sustainabledevelopment.un.org/content/documents/UN-DESA_Back_Common_Future_En.pdf

[5] United Nations Conference on Sustainable Development Rio+20, *The Future We Want* (2012), Rio de Janeiro, Brazil (20-22 June 2012), available at: http://www.uncsd2012.org/content/documents/774futurewewant_english.pdf

[6] International Scientific Congress on Climate Change (2009), available at: http://global-warmingisreal.com/2009/03/14/international-scientific-congress-on-climate-chnage-key-messages/

[7] IPCC, AR5 Working Group II Report on Food Security and Food Production Systems Chapter Seven (IPCC 2014b) (31 March, 2014), available at: http://www.ipcc.ch/report/ar5/wg2/

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climatic threshold which is necessary for essential food crops to grow; NASA in 2015[8] informed that in past 50 years the rate of temperature has nearly doubled; National Geographic in 2016[9] stated that with the rise in global average surface temperature to 0.9℃ the majority of marine life which dwells as deep as 2300 feet is directly impacted and sea water gets more expanded, act as red cards that demands human race to pause and see the type of epochal changes it has made to the greatest common. Plethora of scientific literature points to the fact that humans have surpassed other factors in being the driver of Earth's Biosphere destruction. These studies have been shy to show completely 'emancipatory effects' of the Anthropocene.

IPCC reports are treated as "gold standards" by policymakers. About IPCC a peculiar thing is that these reports focus only on "known knowns" and don't waste time on reporting "known unknowns"[10] and "unknown unknowns"[11]. It is only independent researches by world renowned scientists and researchers[12] have time and again warned the world about the 'emancipatory impacts' of the climate change. Researchers state the dangers of warming around 4℃-7℃. According to them, the allowed natural variability in tropics lies in the range of 2℃-3℃. Beyond that tropics would be *uninhabitable*.[13] One could imagine people evacuating tropics. At 7℃-10℃, the heat stress would cause *hyperthermia*[14] which would be major cause of human fatalities. Thus, presumption of human adaptability to any level of global warming is over assessed.[15] Imagine a scenario where temperature in tropics crosses 3℃. Air conditioning will be new necessity. With more demand of Air conditioning, the power

[8]NASA Earth Observatory, *Global Warming* (2015), available at: http://earthobservatory.nasa.gov/Features/GlobalWarming/page2.php.

[9]National Geographic (2016), http://ocean.nationalgeographic.com/ocean/explore/pristine-seas/critical-is sues-sea-temperature-rise/.

[10]"Known Unknowns" are things which are identified as potentially happening but cannot be really well quantified.

[11]"Unknown Unknowns" are things that constantly challenge humans and that happened but are still not predicted and identified as possible outcome.

[12]Michael Oppenheimer (a professor at Princeton; Chief Scientist of the Environmental Defense Fund's Climate and Air Program) was an early force in the UN efforts on Climate Change that resulted in Kyoto Protocol. He was lead author of IPCC's 2014 AR4. While giving an interview he categorically mentioned the constraints in IPCC reporting. Steven C. Sherwood is a Professor in University of New South Wales and part of Climate Change Research Centre. His main works are in the field of climatology and meteorology. Matthew T. Huber is an Associate Professor of Geography and Environment in Syracuse University. His main contribution in the field of resource geography and climate change politics.

[13]David Wallace Wells, "The Uninhabitable Earth: Famine, economic collapse, a sun that cooks us: What climate change could wreak — sooner than you think" *Intelligencer*, available at: https://nymag.com/intellige ncer/2017/07/climate-change-earth-too-hot-for-humans.html

[14]Hyperthermia, also known simply as overheating, is a condition where an individual's body temperature is elevated beyond normal due to failed thermoregulation. The person's body produces or absorbs more heat than it dissipates. When extreme temperature elevation occurs, it becomes a medical emergency requiring immediate treatment to prevent disability or death. Almost half a million deaths are recorded every year from hyperthermia, ten times more deaths than from hypothermia.

[15]Steven C. Sherwood and Matthew T. Huber, *"An adaptability limit to climate change due to heat stress"* PNAS, available at: https://www.pnas.org/content/107/21/9552

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requirements would rise; if by then the world has not shifted to the renewable sources of power then more greenhouse gases will be added. A vicious loop is created. People will be forced to remain indoors. The power cuts would become lethal. Who can afford it is question not even worth asking. The third world countries, livestock, biosphere and outside workers worldwide will face major causalities. It is claimed[16] that world without any strong mitigation policy would witness over 7°C warming in this century alone. The AR5 Synthesis Report[17] predicted that if business-as-usual continues at even medium range, the warming is predicted at 4°C. The European heat in 2003 killed around 2000 people a day even when temperature was not 4°C. But the way negotiations at international level are going, the medium range prediction is shy to show the truth. Polycentric nature of climate crisis is never captured by IPCC reports holistically. Still these reports and scientists behind them are criticized for reporting exaggerated results and that they working for ulterior motive (so that they continue to receive aid for their studies). An important note here is that IPCC might be reporting in lower terms so as terrorize the world and let the policymakers agree to lowest denomination possible at the international table. This is called "scientific reticence" where scientists are rewarded for showing lower denominations of threats by promoting their work more in research circles. On the basis of IPCC reports, Paris climate agreement gives the goal for 2°C (and if possible 1.5°C). But the independent researches hold this target at slim odds.[18] Even if 2°C target is met, cities like Karachi and Kolkata will be uninhabitable and countries like Miami and Bangladesh will extinct.[19] It is estimated that farm labour in lower Mississippi Valley and entire area east of Rocky Mountains (U.S.A. and Canada) will be under heat stress more than any area around the world.[20] Farmers of sugarcane in El Salvador will experience chronic kidney disease making their lives short (without expensive treatment they could survive only for few weeks only). New York will experience weather as it exists in present day Bahrain and in Bahrain Humans will experience hyperthermia even in sleep. It is the belligerent Middle East and Persian Gulf that will be impacted most, making Hajj completely unimaginable.

Further the land use involved in Agriculture and Forestry is responsible for 25% of global anthropogenic emissions. At present the global produce around the world is sufficient to feed the entire population of the planet. But the only problem is food access, so 10% of population

[16]*Ibid.*
[17]IPCC, *Climate Change 2014: Synthesis Report Summary for Policymakers*, available at: https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf
[18]Lisa Friedman, "Little Chance to Restrain Global Warming to 2 Degrees, Critic Argues" *E&E News* (2015) https://www.scientificamerican.com/article/little-chance-to-restrain-global-warming-to-2-degrees-critic-argues/
[19]World Bank, *Turn Down the Heat: Climate Extremes, Regional Impacts and the case for resilience,* Potsdam Institute for Climate Impact Research and Analytics (World Bank Publications, 2013).
[20]*Ibid.*

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is undernourished. The change in climate impacts the productivity of produce and reduces its calorific value. At expected 5℃, 50% less food grain will be available for 50% more population.[21] Around 800 million people are expected to be undernourished in future. Droughts and flash floods directly impact the produce and top soil. Water to grow produce will become scarce. The food insecurity in future will grow due to rising food prices (water and energy prices will be higher) and reduced productivity. The intensification of agriculture (due to reduced productivity) with increased demand of livestock (major cause of methane emissions) in future will add to more GHGs. Some may argue that global warming will make available new land for agriculture (when the ice in higher latitude countries will melt) and yield of some crops will increase. But this again is subject to impact of extreme weather events and productivity in northern parts of the world like remote Canada and Russia will depend on quality of soil. Studies[22] show that average crop yield will increasingly decrease. Thereby impacting agriculture and forestry in negative way (directly and indirectly). The present breadbasket regions (China, Southern Europe, Australia and Africa) of the world would become deserts much worse than American dust bowl. There will be land competition between different sectors in future. For example, whatever project for renewable sources of power we pick (be it solar, wind, hydroelectric dams) all need land (which is finite source). Thus, distribution problem will arise. Business and Human Rights Resource Centre (hereinafter BHRRC) noted violation of human rights[23] in the transition to green energy in Central and South America, East Africa and South East Asia (all in the category of least developed).[24] The shocking fact is that 31 out of these 50 projects reported to violating human rights were registered under UN's Clean Development Mechanism[25] (hereinafter CDM). Thus, land rights are and will be impacted severely.

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[21]David S Battisti and Rosamund L. Naylor, "Historical Warnings of Future Food Insecurity with Unprecedented Seasonal Heat" 323 (5911) *Science* 240-244 (2009), available at: https://science.sciencemag.org/content/323/5911/240.abstract (last visited on Apr 11, 2018).

[22]R. Bailey and T.G. Benton, et al., "Extreme weather and resilience of the global food system (2015): Final Project Report from the UK-US Taskforce on Extreme Weather and Global Food System Resilience" *The Global Food Security Programme, UK*; Also see T. Wheeler and J Von Braun, "Climate change impacts on global food security" 341(6145) *Science* 508-513 (2013).

[23]Dispossession of local people out of their land, undermining their livelihoods, threats to life and intimidation, killing and displacement most reported violation in these countries.

[24]BHRRC, Press Release: 50 Renewable Energy Companies, Human Right Policies and Records examined (2016), available at: https://www.Business-human-rights.org/en/press-release-50-renewable-energy-companies%E2%80%99-human-rights-policies-records-examined

[25]The CDM, defined in Article 12 of the Kyoto Protocol, was intended to meet two objectives: (1) to assist parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which is to prevent dangerous climate change; and (2) to assist parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments (GHG emission caps). The CDM is one of the Flexible Mechanisms that provides for emissions reduction projects which generate Certified Emission Reduction units (hereinafter CERs) which may be traded in emissions trading schemes.

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When the "Doomsday Vault"[26] was conceived, nobody thought of thawing of permafrost. In 2017 the winter in the Nordic states felt like summers. It was recently that concerns for global seed vault were raised. The Arctic permafrost contains twice as much carbon dioxide as presently in the atmosphere. If this permafrost melts then the trapped Carbon Dioxide will be released as methane gas (which is 34 times effective in creating greenhouse effect than carbon dioxide). This means 86 times larger threat is in the near future. IPCC reports have never accounted for all the factors of global warming: The Albedo effect (lees ice means less reflection and thereby means more sunlight absorption); more cloud cover (act as a heat trap); or the dieback of forests and other flora (fewer natural sinks). Melting of ice will not only rise sea level but will have another polycentric impact. Ice is acts as climate ledger; history is frozen in it. Prehistoric plagues and terrifying bugs with which humans have no contact will pose danger of causing pandemic. In Alaska scientists found the remnants of 1918 flu (from body of frozen women). This flu is notorious to have killed nearly 100 million people and infected 500 million people. Scientists have strong belief that remains of bubonic plague and smallpox are trapped somewhere in Siberian ice waiting for release. In 2016 a 12-year boy was reported to be killed, 20 people and 2000 reindeer to be infected by anthrax infection caused by bacteria which was at least 75 years old (released due to permafrost thawing exposing 75 years old body of reindeer).[27] Some argue that these bugs may not survive thawing of permafrost. But the studies show that many of these bugs are 'extremophile' and the countries around the world are reviving[28] these bugs in their laboratories[29]. With globalization and human mobility, the diseases will be rewired, re-evolved and relocated around the world. For example, Zika Virus once trapped in Uganda threatens world, nobody is immune today from its effect. In 2050 population beyond tropics will be equally threatened by malaria (today supposed to be tropical disease).

The concentration of carbon dioxide has crossed 400 parts per million mark. Some researches highlight that 1000 parts per million mark will be achieved in 2100. At this level of concentration there will be 21% in human cognitive ability.[30] The life expectancy will be reduced by 9-11 years with increase of 10 micrograms per cubic meter in pollution particles.

[26]The Svalbard Global Seed Vault is located in Norwegian island Spitsbergen (opened in 2008). It was to protect agriculture from any catastrophe by keeping the seeds of variety of plants in frozen state.

[27]Anthrax outbreak triggered by climate change kills boy in Arctic Circle, *The Guardian,* available at: https://www.theguardian.com/world/2016/aug/01/anthrax-outbreak-climate-change-arctic-circle-russia

[28]An 8 million years old bug was brought back to life in 2007 and a 3.5 million years old bug was self-injected by a Russian Scientist out of curiosity in 2009.

[29]Jasmine Fox-Shelly, "Some life forms may have been alive since the dinosaur era" *BBC Earth* (3 June, 2018), available at: http://www.bbc.com/earth/story/20160602-some-lifeforms-may-have-been-alive-since-the-dinosaur-era

[30]Joseph Romm, *Climate Change: What Everyone Needs to Know* (Oxford University Press, 1st ed., 2015).

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By 2090 the risk of autism in child will be tenfold and around 2 billion people globally will live at above "safe" level as considered by World Health Organization (hereinafter WHO). The wildfires are at increase around the globe due to rising temperatures and this adds more GHGs in the atmosphere. Amazon rain forest in 2010 experienced second "hundred-year drought" in gap of just five years. If this dries out and forest fire occurs in Amazon, it would be bad as it is source of 20% of oxygen. In beginning months of 2020 Amazon rainforest was cleared more (51% more) than the previous year. The cut trees will be set to fire in dry season by the land grabbers in Amazon, increasing the threat of forest fires.[31] Peat Forest like the ones in Indonesia contributes more to the emissions.[32] Apart from that the smog problem is frequent; in some areas it crosses the highest risk level of "301 to 500"[33] on Air Quality Index. In 2013 the level of smog crossed the mark of 800, the phenomena deserved to be named as "Chinese Airpocalypse".

The studies on relationship between global warming and civil war around the world are still in the conception stage. There is no doubt that for the demand of oil Middle East burns. But this is not due to climate change. Some studies[34] found that crop failure and droughts have been one of the contributing factors (not sole factor) to the civil wars in Lebanon and Syria. There will be expected 10%-20% rise in conflict with every half degree of warming. At 5℃ there will 50 % more wars as are seen in the present world. The "water wars" or the wars to control the sources of fresh water are the root cause of major dispute between countries in Africa and Arabian Peninsula. With warming the productivity of crops decrease, farmers who already live at the edge of subsistence may resort to other means to put food at table; joining conflict is one of them. There are studies that show there is relation between heat stress and crime rates. One study[35] analyzed the impact of heat stress and increase in crime rate in Los Angeles. The study mentions the rise of 2.2% in general crime and 5.7% in violent crimes on days with temperature higher than 85 degrees. In the regular world some negative shocks of climate change fall short of being called as "civil war"- due to monsoon failure in India, estimated 670 million people

[31]Caio de Freitas Paes, "Amazon fires may be worse in 2020 as deforestation and land grabbing spikes" *Mongabay* (18 May, 2020), available at: https://news.mongabay.com/2020/05/amazon-fires-may-be-worse-in-2020-as-deforestation-and-land-grabbing-spikes/

[32]Peat land fires in Indonesia in 1997 added to the global carbon dioxide release by up to 40 percent.

[33]Beyond this range warning of "serious aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly" is issued. For other people the risk of respiratory disease is serious and outdoor exertion will not be permissible anymore.

[34]Marshall Burke and Solomon Hsiang, et al., "Climate and Conflict" 7 *Annual Review of Economics* 577-617 (2015), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2640071

[35]Kilian Heilmann, Matthew E. Kahn, "The Urban Crime and Heat Gradient in High and Low Poverty Areas" *National Bureau of Economic Research*, available at: https://www.nber.org/papers/w25961?utm_campaign=ntwh&utm_medium=email&utm_source=ntwg23

(constituting 10% of the global population) made more demand for power for irrigating fields and air conditioning houses; this led to grid failure in 2012.

"Fossil Capitalism" has been topic of debate in the aftermath of 2008 economic crisis. It is argued that the level of development is not due to any innovation or globalization but due to fossil fuels; once these fossil fuels end, the economy will remain steady forever. From economics point of view, fossil fuel in particular and natural resources in general are part of capital (with no further scope of recapitalization) that needs to be used efficiently. But the current capitalist class treats it as revenue that has to be spent. One study projected if the global emissions continued at current pace; there is 12% chance that global output will be reduced by 50% in 2011 and the decrease in per capita GDP will be 20% pegged at 51% probability. The Great Depression had decreased global GDP by 6% in comparison. Thus, capitalist calculation of continuing with fossils and use technology to adapt to damages of climate change is absurd one. In 2017 large number planes were grounded at Phoenix Airport (Arizona, U.S.A.) due to rising of temperature to 120 degrees.[36] This might seem very small example, but it displays that emancipatory effects of climate change on technological advancement are still "unknown unknown".

The "killer" seas are most talked in climate debates. Some studies[37] went to assess the impact of sea level rise of four-feet on Low Elevation Coastal Zone[38]. As per the study two groups of countries fall in this area: one, small and least developing island nations and second deltaic regions of industrialized countries with huge population concentration. With rise of 4 to 10 feet in seal level, at least 600 million people will be impacted. In this area the share of population of small and least developed countries is more than industrialized states and the disparities get more pronounced due to rural-urban divide. Oceans are carbon suckers. But today oceans are facing acidification (which may add to half a degree of warming by 2100) and coral bleaching (reefs have largest concentration of marine life, source of fisheries for half a billion population). It is definite that majority of marine life will die and whatever species survive the impact of acidification is yet to be ascertained on them. The dead zones[39] are already visible in Gulf of

[36]Hotter air is less dense, which means less lift for planes trying to take off. Plane would need more runway time to take off.

[37]Gordan McGranahan and Deborah Balk et. al., "The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones" 19 (1) *International Institute for Environment and Development* (2007), available at: https://journals.sagepub.com/doi/abs/10.1177/0956247807076960.

[38]Low Elevation Coastal Zone (LECZ), defined here as the contiguous area along the coast that is less than 10 meters above sea level.

[39]Dead zones are areas where oxygen eating bacteria survives and all fisheries are wipe out. These grow like cancer cells grow in body and choke up the entire system.

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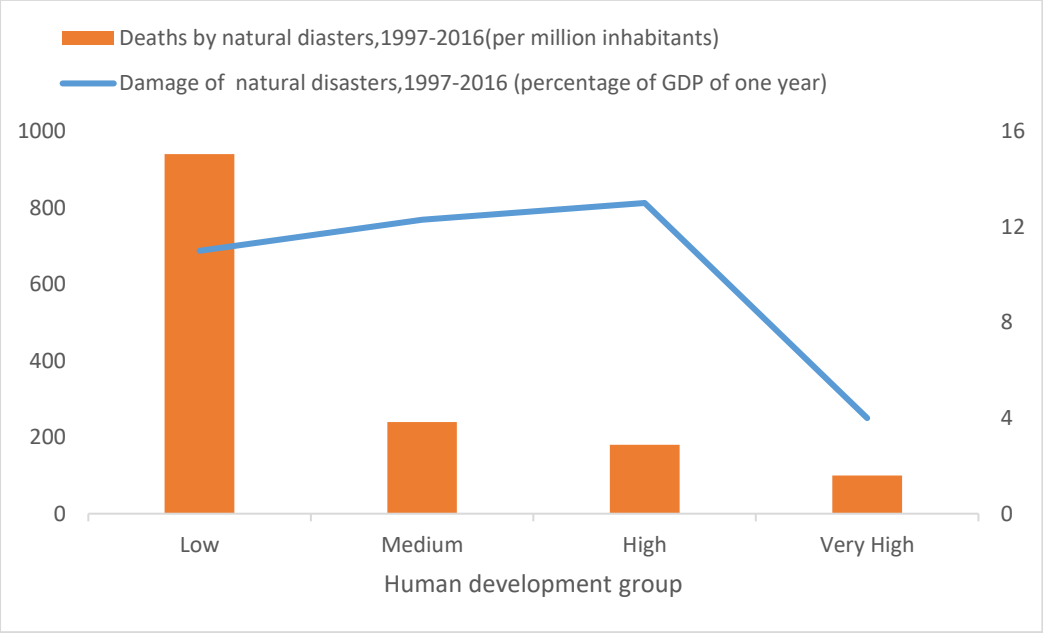
Mexico. The "skeleton coast" off Namibia is notorious for Hydrogen Sulphide[40] bubbling out of sea; a gas which can become reason for natural holocaust.

So far the discussion tells us only about the 'emancipatory effects' of climate change. But these effects are and will be distributed unequally across the globe because of underlying social inequalities prevailing in the society. This happens because of underlying multidimensional inequalities (in terms of gender, poverty, caste, creed and age), these people (or communities or countries as whole) gets exposed to climate hazards in a big way; are more susceptible to climate damages and are less able to cope with (due to less private and public resources) and recover (capture of politics by rich class and government policies continue to be based on GHG intensive system of capitalism) from damage caused by climate hazard. A vicious cycle is created whereby these disadvantaged groups suffer disproportionate loss of assets and income.

Figure 1: Loss of life across the countries (based on level of income) in wake of natural disasters



Source: The Human Development Report 201941[41]

In case of women, the already existing inequalities get enhanced in wake of climate crisis. Such is state that women and environment are the two dimensions that suffer at the hand of greenhouse gas intensive capitalism and social biased norms. Women would suffer range of

[40]It is highly toxic gas that has fouls smell easily detectable by human nose. It is poisonous, corrosive and flammable.

[41]United Nations Development Programme (hereinafter UNDP), *Human Development Report 2019: Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century*, available at: http://hdr.undp.org/sites/default/files/hdr2019.pdf

injustices in the wake of climate crisis like: impact on livelihood[42]; decreased food security and threat of being malnourished[43]; decreased access to water and sanitation[44]; trapped in vicious circle of poverty and vulnerability; increased burden of care giving[45]; facing abuse[46]; and lack of capabilities to survive and rebuild life. Such injustices are also faced by other dependents like elderly, children and poor people.

What is at the core of all these "emancipatory impacts"? The basic Human Rights which are recognized by various international covenants and treaties are at stake. These rights are:- Right to Life, Right to Food, Right to Water and Sanitation, Right to Health, Right to Housing, Right to Education, Right to Self- determination, Right to Development, Right to meaningful and informed participation, Right of Future Generations, etc. these rights are well recognized by various conventions and protocols like Universal Declaration of Human Rights (hereinafter UDHR), International Covenant on Civil and Political Rights (hereinafter ICCPR), United Nations Charter (hereinafter UN Charter), International Covenant on Economic, Social and Cultural Rights (hereinafter ICESCR), Convention on the Elimination of Discrimination against Women (hereinafter CEDAW), etc.

From the above explanation it is clear that climate change with its "emancipatory impacts" is a 'social justice conundrum'. Thus, an immediate action is called for in the interest of humans and the planet itself.

A valid question comes to mind: if science is clear about the cause and plausible effects of climate change, then why no concrete step is still arrived at? It is because there are certain ethical peculiarities in climate crisis. These peculiarities are explained below: -

- If any action is taken today to reduce emissions the benefit of these actions will be endowed upon future generations and not present generations. Also, it is the present

[42]Women constitute 43% of the agricultural workforce across the globe. With climate change agriculture will greatly suffer and so do the women by losing their work and livelihood.

[43]43% women contribute to as much as 90% of food production majorly in Africa, if their needs are not addressed in climate policy then there will threat to food security. Hunger and malnourishment make people weak and further reduce food productivity. Children will be more susceptible to malnourishment and thereby cannot assist mothers and thus women have to share more burdens of household chores and might leave job to take care of children. Women even eat less so as to provide sufficient on the plate of their children and other family members.

[44]With reduction in ground water and in wells, women who are mainly responsible for collecting water have to travel more in search of water or have to spent more time in collecting water. Moreover, women need water to maintain their hygiene which they have to forgo if sufficient water is not available.

[45]Women are primary care givers. With increasing burden of vector-borne diseases like cholera and malaria, women have to take up increasing responsibilities of care-giver.

[46]Women will be more susceptible to abuse and violence as their male partners becomes more violent in case of armed conflicts and on loss of work and property. Domestic violence spikes in the wake of sociopolitical and economic pressures. Majority of displaced population comprises of women and children. In refugee camps they face rapes, violence, force marriages and trade their bodies for money.

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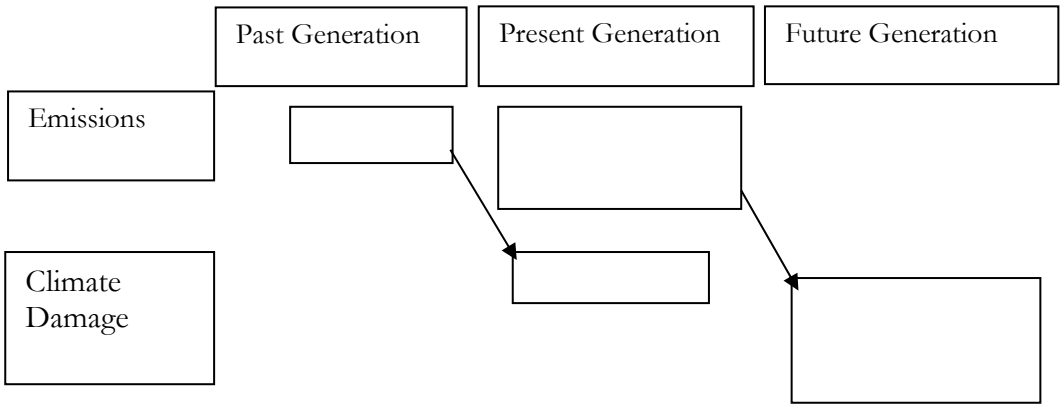
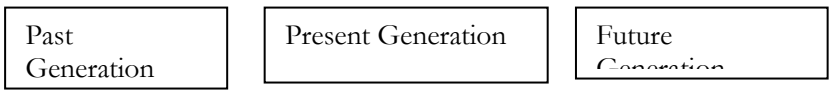
generations that have to bear burden of taking any action. On the other hand, if no action is taken today, the present generations will continue with affluent life and it is the future generations who will suffer. Thus, temporal stretch of climate change includes *intergenerational dilemma* within it. Furthermore, some argue that obligations based on justice only arise when two persons or communities (in our case two generations) stand in relationship[47] with each other. The distant future generations are strangers for present generations, with whom they stand in no relationship.

Diagram 1: Temporal Distribution of Climate Change



- The above case scenario also involves the violation of principles of natural justice in it i.e., "the present generation is acting judge in its own cause". The benefit of not acting falls on present generation.
- The impact of climate change is not spread temporally, but spatially also. The impact of climate change is not restricted by physical state boundaries. The emissions generated by one country (say U.S.A. who is not ready to sign any binding treaty on emission reduction) will impact the people living in other countries, especially people of small island nations and least developed countries. Further within same affected region the impacts are distributed unevenly where poor, elderly, women and children are worst affected groups. The cost and benefit of action or no-action fall on different persons. Thus, it is a *global problem*. Taking queue from relationship-based obligations; some argue that as people of one community or country stand in no relation to other community or country. Thus, they owe no moral duty towards them.

Diagram 2: Spatial Distribution of climate change



[47]This relationship does not necessarily mean blood line relations. This relationship can be based on mutual benefits (like in Pension schemes around the world, where younger generations make payment to older retired people as when they will be older, they will receive such benefit in return for next younger generations); relationship with public institutions and relationship with community sharing common culture and descent.

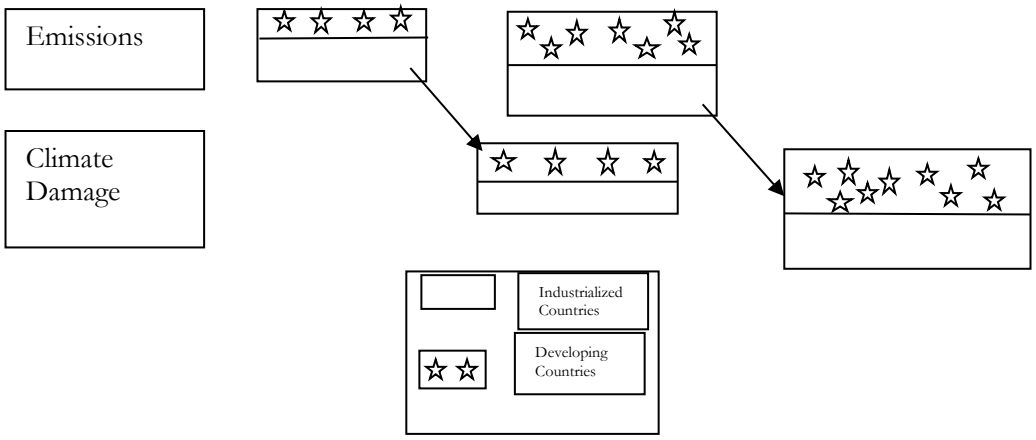
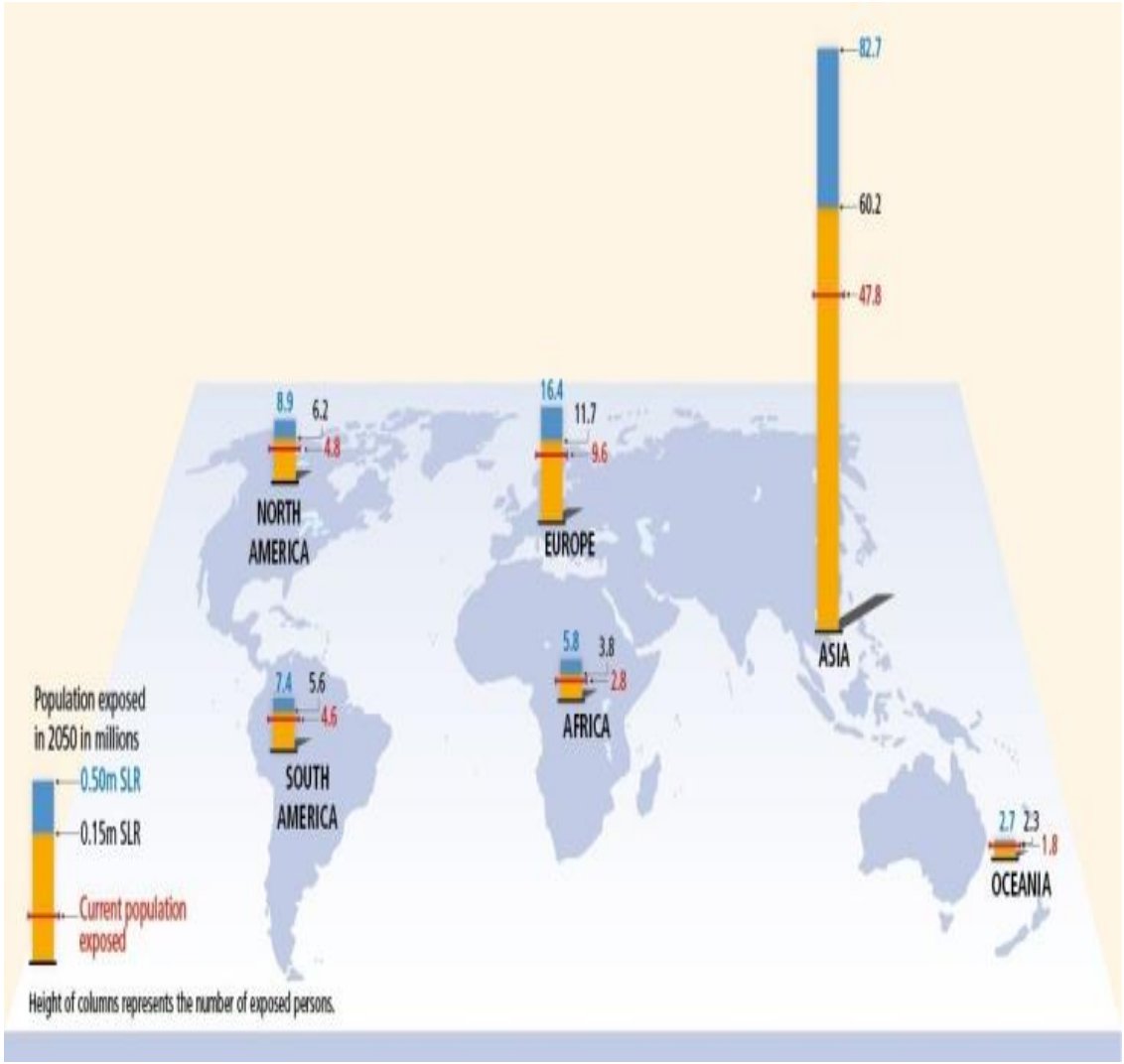


Figure 2: Spatial Distribution of Population exposed to Sea Level Rise (SLR)



Source- IPCC (2014)48

[48]J.Y. Handmer and Z.W. Honda et al., IPCC (2014), *Changes in impacts of climate extremes: human systems and ecosystems. Chapter 4 in: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* (IPCC). pp. 231-290.

- Moral claims are successful where well located harm is clearly visible and also where the act and the actor can be located with certainty. For climate change, small, fragmented and everyday human actions directly or indirectly, individually or in combination with other activities generate some harm. But this harm is not visible in front of the actor. For example, A commits murder of B; here the harm caused and by whom is clearly visible. But in case of climate change, everyday activities (like taking personal vehicle rather than public transport or wastefully using power in homes) done by all humans do not clearly highlight the harms caused and actors responsible. Moreover, such activities are done by majority of population, providing these actions legitimacy on local and global level. This bars any action on individual side. So, there is *fragmentation of causes and effects*.
- The uncertainty about the plausible impacts of climate change is fraught in the minds of normal people. When it is uncertain that global temperature will touch what degree at medium or business at usual rate, climate policy is bound to take considerable risk in deciding about actions on climate change. Thus, there is *uncertainty problem*. Everyday ethics only mandates action in face of certain threat. But what is threat is only probable?
- Some argue that it is already too late to take any action. Climate crisis is bound to happen. Then why do anything in face of it.

II. A PERFECT MORAL STORM

The responsible force behind this is the ever-increasing human population with their increasing rate of growth i.e., a system of capitalism and consumerism. Humans did create a mess and they should be ready to take up responsibility (thus a moral duty exists). The moral principles of minimum duty of no harm i.e., even in absence of relationship one owes responsibility of not causing harm to strangers comes into play. Also, the present generation will have relation with intermediary generation that acts as link with future generation.[49] Being born as *humans per se* is sufficient factor to owe duty towards other human beings. Some argue that science has not put the impact of climate change with absolute certainty, so why to owe responsibility of something uncertain. To counter this one needs to realize that future anyway is uncertain and second, in case of climate change uncertainty persists on the extent of harm that will be caused and not about whether harm will be caused or not. Science is not sure about everything but had put enough details on table that demand action. Some argue that window of opportunity

[49]The emissions from the activity of 30-year old woman today will lead to discernible global warming in as little as 50 years. Therefore, woman's children, born today who will be 50 years old, will be affected by the emissions resulting from his/her mother's activity.

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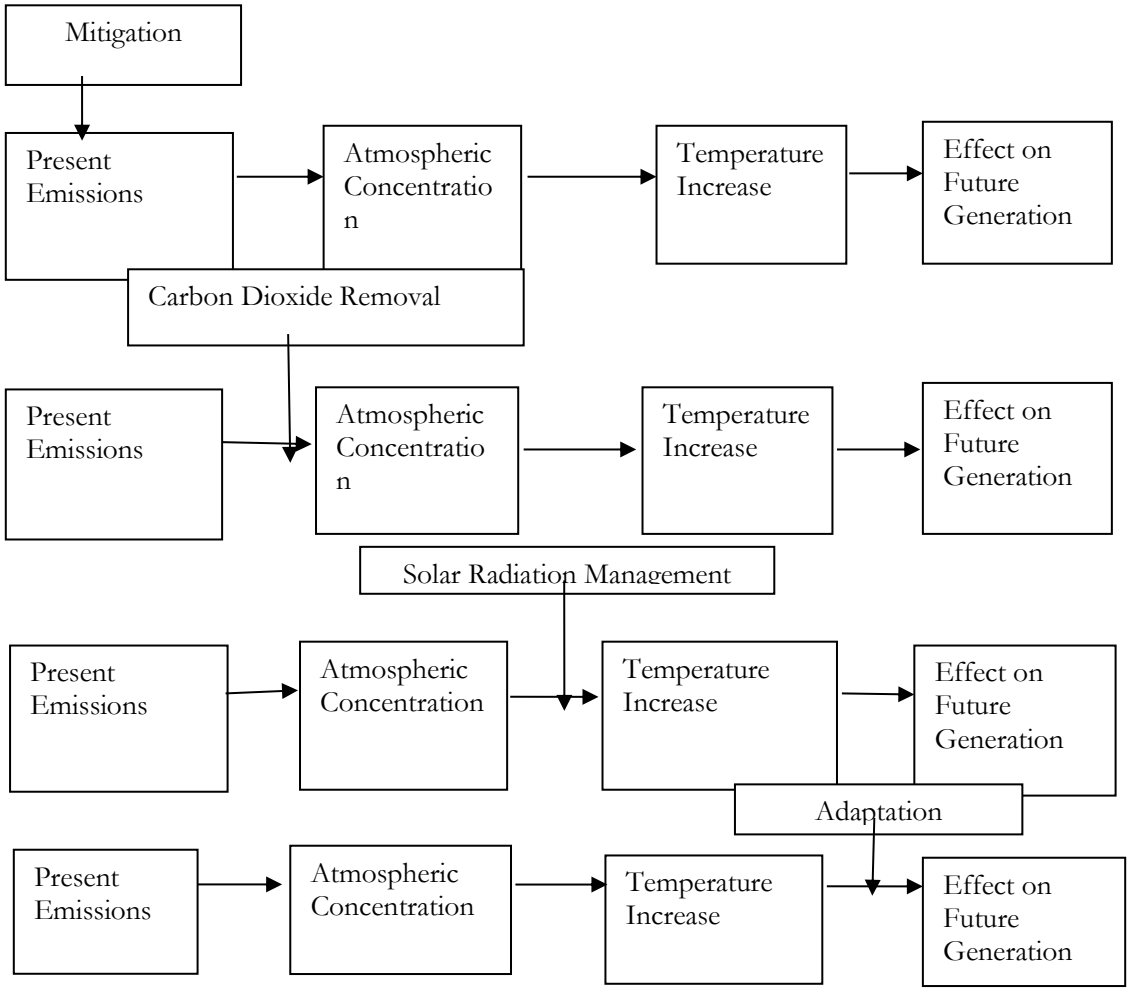
is closed, no need to do anything even if humans are behind the mess. This dilemma can be solved if it is realized that action is not needed to mitigate climate change completely but to avoid the most dangerous and morally problematic climatic changes.

It is clear that some measures have to be taken up. But *what* measures are to be taken? There are three alternatives: - mitigation (avoid harm), adaptation (increase adaptation capabilities) and climate engineering (large scale technological interventions in climate system including solar radiation management and carbon sequestration).

Diagram 3: Different ways to deal with Climate Change- Mitigation, Climate Engineering and Adaptation



The above diagram represents the chain formation reaction in climate change. The above chain can be broken by four ways: break the very starting point of the chain or break any of the three inter-mediate links in the chain. The present efforts seem more focused on either adaptation or climate engineering. Adaptation as a strategy allows the chain to continue till temperature increases and then intervenes by taking measures like sea walls, dams or barrages, new drought

resistant types of crops, rain water harvesting, desalination plants, early warning systems, improvements in health system and vaccinations etc. As warming has already taken place, so some degree of adaptation measures will be needed. But taking it to be alternative to mitigation and sole solution will be wrong step forward. Climate engineering involves breaking the chain in first and second intermediate stage: carbon dioxide removal techniques (like fertilizing oceans or diffusing silicates at large scale level that can bind greenhouse gases and thereby reduce their atmospheric concentration) and managing solar radiations[50] (through deployment of large sunshades in space, brightening surface of the Earth, artificial cloud formation or spraying cooling aerosols in the atmosphere) simultaneously. Both adaptation and climate engineering are considered cheaper than mitigation and thus are taken to be morally viable solutions. But morally does not depend upon cost of particular action. Cost only becomes a moral issue only when it is morally unacceptable by those who have to bear the cost. Thus, the burden of mitigation is not to be borne by single country, rather distributed fairly among present generation. Also, number of studies[51] shows that the cost of mitigation (depending upon how much mitigation needed) is within morally acceptable range; only low single-digit percentage of annual economic output has to be contributed. These two alternatives have certain new risks involved which can be unexpected at this point: dams may burst up, fertilization of oceans cause negative impact on food chain and on species diversity, artificially brightening of Earth may entirely change the natural landscape or drought resistant varieties of crop may not be successful. Minimizing these risks in future may involve complex and expensive process. Some argue that consensus on climate mitigation in the real-world politics is difficult to achieve as already visible in global talks. But the same is true for adaptation and climate engineering. The Green Climate Fund[52], which was established for mitigation and helping developing countries to adapt (mainly), is facing hard times. With U.S.A. (second biggest contributor) withdrawing from Paris Agreement and still short of its target to raise US $ 1500 billion per year, Green Climate Fund is like a few drops of rain in desert. So far it has raised US $ 20 billion and has committed US $ 5.6 billion for the green projects (out of which US $ 3.9 billion had been distributed).[53] Focusing more on climate mitigation will help in controlling not only "known

[50]In such technique, the concentration of greenhouse gases does not change, either less solar radiation reaches the Earth or Earth would be able to release more radiation back into space, so that temperature would not rise.

[51]Nicholas Stern, "The Economics of Climate Change: The Stern Review" 98(2) *American Economic Review* 1-37 (2008); Ottmar Edenhhofer and Terry Barker, et al., "The economics of low stabilisation: exploring its implications for mitigation costs and strategies" 31 *Energy Journal* (2010).

[52]Green Climate Fund was mentioned for the first time in 2009 under UNFCCC COP-15 held at Copenhagen. But it was formally established in 2010 during UNFCCC COP-16 at Cancun.

[53]Siddanth Prasad, "How's Green Climate Fund doing?" *The Statesman* (26 July, 2020), available at: https://www.thestatesman.com/opinion/hows-green-climate-fund-1502882472.html (last visited on Aug 11, 2020).

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knowns" but "known unknowns" and "unknown unknowns". In adaptation and climate engineering, it is not known what new dangers will arise but it is certain that "residual risks of their ineffectiveness"[54] will always loom upon the world. Furthermore, the *maximin* principle makes the case for choosing that alternative for which the worst-case scenario is least bad. That approach in which there is sufficiently low-level risk involved in right violation of future generation be adopted. Therefore, mitigation is moral duty to be performed by present generation and solutions like adaptation and climate engineering are just fillers along the way to support the main effort. Funds and efforts should be focused more on mitigation as diverting the funds and efforts would increase the cost of entire process.

Next question is *how much* mitigation efforts are needed to clean up mess (keeping in mind the uncertainty of impacts of climate change)? The quantification of the mitigation effort will-based on three alternative approaches in achieving the well-being[55] of future generation: a) future generation are entitled to *more*[56] than present generation has; b) future generations are entitled to *as much* as the present generation today has; or c) future generations are entitled to *enough* to live life on this Planet. But most of the time this question is looked from other side: *how much* the present generation should sacrifice in mitigation efforts? As already stated, this is violation of Principle of Natural Justice (*nemo judex non causa sua*[57]). But the exception of necessity applies here, so present generation has to decide.

Utilitarian's will support the idea of providing *more* well- being to future generation as they focus on aggregate outcome i.e., maximizing aggregate wellbeing of every human being (present and future).[58] But this will be against the distributive justice concept as present generation has to forego more to achieve more well-being of future generation. Also, it is too unrealistic to expect that future generations will be better off than present generation.

As much alternative is supported by reciprocity concept (what the present generation got from

[54]Such infrastructures like houses and trains, etc. cannot be fully insulated from destruction caused by Hurricanes and sunshades in the outer space could be destroyed by passing meteors which can never be replaced overnight.

[55]Well-being of two generations can be measured on GDP target basis (allowed reduction of 5% to 20% in GDP at global level to meet mitigation cost) or allowed limit for temperature increase or keeping the atmospheric concentration of greenhouse gases below 350 parts per million or 450 parts per million range or on basis of emission budget (limiting carbon dioxide emissions per person per year to 1 ton or global emission limit of 1 trillion ton.

[56]The Stockholm Conference in 1972 called not only to protect environment but also to *improve* and to *promote the future growth*.

[57]*Nemo judex in causa sua* (or *nemo judex in sua causa*) is a Latin phrase that literally means "no-one is judge in his own cause". Nemo judex in causa sua is popularly known as the rule against bias. It is the minimal requirement of the natural justice that the authority giving decision must be composed of impartial persons acting fairly, without prejudice and bias.

[58]Sacrificing something today is taken to bring aggregate happiness in future. For example, forego expenditure and invest what is saved. This will earn interest in future for your investment along with assured savings in bank.

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past generations that much should be given to future generation) and that natural resources are global commons that are to be used and not exhausted (they are not private property of any generation). This is nothing but an expression of equality requirement.

The *enough* approach is based on human needs. Even the idea of sustainability reflects need-based approach.[59] The needs approach is better than desire approach (entitled to more) because desires can never be satiated and needs across the generations remain very much similar. Along with that this approach can incorporate human rights within it. The future generations should be left with such world where human rights can be fulfilled. Thus, this approach calls for the world with decent human life (not just bare minimum needs). Morals and ethics hail this approach undoubtedly. Human rights are not ends but are means to achieve anything in life. What "better than or is equal to" is very difficult to assess in the ever-changing world in terms of culture, technology, politics and religion. But the assessment in terms of human rights and need (say in terms of food and health) is easy as they remain similar across the generations. The comparison of more or less or equal becomes redundant once needs are satisfied. Moreover the "better than or is equal to" approaches demand more political control and interventions. It can also be stated that "sustainability or sufficiency comes first" and rest will follow automatically.

According to Stern Review[60] estimated cost of climate change will be 35 % of global GDP in 2200 and the level of development in the same year will be that which had been in 2190 without climate change impacts. Thus, the economically the future generation would be better off than present generation. But note that this is average global growth rate which does not mean all people in future generation would be better than present generation (there is no guarantee of society based on distributive justice). Many people in future would be worse off than present generation because climate change will exacerbate already existing inequalities.

The next most debatable question in climate diplomacy is: *how* the responsibility of mitigation and adaptation *should* be distributed? This is question which involves *intragenerational global climate justice*. A quick answer to this is that there should be *just* distribution. But what constitutes *just distribution* is underlying question? The UNFCCC answered the question be adopting the principle of "common but differentiated responsibilities and respective capabilities".[61] But the phrase is far from giving any clear answer and has different

[59]The Brundtland Report of 1989 defines sustainability as "Sustainable development is development that meets the needs of the present without comprising the ability of future generations to meet their own needs".
[60]*Supra* note 81.
[61]Art. 3.1 UNFCCC states "The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their *common but differentiated*

interpretations. The word "responsibility" may be taken to be based either on countries share in causing climate change or on countries that benefitted economically the most from emissions. Similarly, the words "respective capabilities" create deception. It may mean countries capable of having technological know-how or countries capable of bearing financial burden. Moreover, this phrase itself is most debated and reason for many countries to withdraw from the agreements on climate policy. Another hidden question in distribution debate is *what is to be distributed*: money, emissions or well-being. In terms of money the question involved is who will pay for mitigation, adaptation, loss and damages and technological research, development and diffusion. In terms of emission the question involved is how to distribute the emission budget (total permissible emission balance – emissions exhausted in past) or who has to reduce how many emissions (natural sinks creation and management). Thus, an in-depth analysis of "principles of distributive justice" i.e., fair distribution of benefits and burdens of climate change among *intrageneration* is needed. Broadly there are five solutions for deciding what should be distributed to whom and why: a) equality based; b) responsibility based; c) ability based; d) benefit based or e) sufficiency based. The **equality based principle or grandfathering** calls for equal reduction of emissions by all. This approach favors the distribution of emissions that need to be reduced for preventing climate change among all countries so as to maintain the status quo because the past emission levels have created entitlements in favor of the countries. So, for example, globally the target of emission reduction till 2050 is 50%. So, by maintaining the aspect ratio of past emissions in relative terms (not absolute terms) among all countries this target can be achieved (Diagram 4). But this is not correct choice as even if burdens are distributed equally, it is poor (individual or country) who will bear burden more heavily than rich (individual or country). In poor countries the money which might be needed for maintaining subsistence level will be diverted to mitigation efforts. Also, some countries might not have capacity to share the burden and might have special needs like spending on adaptation measures more.

responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof".

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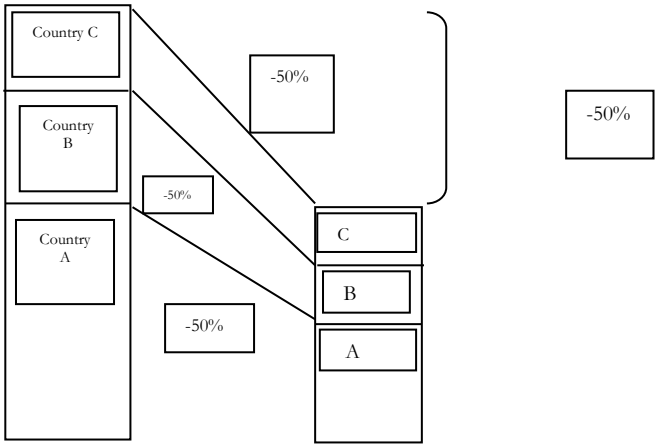
Diagram 4: Grandfathering



The **responsibility based principle or "polluter pay principle"** takes two simultaneous routes for distribution the costs of adaptation, losses and damages and mitigation: a) the cost of adaptation and losses and damages be distributed among those who are actually responsible for the mess in proportion to their contribution; b) the remaining cost i.e., cost of mitigation be distributed among all in inverse proportion to their contribution in the mess. So, if countries like U.S.A., UK, Russia and Germany have emitted more and thereby polluted more, they should pay for the costs of adaptation and compensation (Figure 3). But this is not correct solution as: a) it presupposes certain assumptions of fairness like nobody is entitled to more, but the principle in the first place is applied to search the answer for 'who is entitled to what'; b) the people in the countries who actually polluted in the past and consumed the major share of emissions might be dead, then this principle want the present generation of these people to bequeath the burden; c) people did not know about the adverse impacts of climate change before 1980[62], so blaming for emissions prior to that period seems wrong; and d) the question "who is actual polluter producer country or consumer country" as world became globalized.

Figure 3: Global Carbon Dioxide Emissions based on Regional division in 2016

[62]The first evidence of greenhouse effect is often attributed to two independent studies: John Tyndall in 1859 observed that concentration of few gases blocked infrared radiations, and thereby can cause climate change; Swede Svante Arrhenius in 1896 observed that industrialization and coal burning will enhance natural concentration of greenhouse gases; and Guy Stewart Callender in 1938 raised alarm that increasing temperature is due to increasing concentration of carbon dioxide. But it remained as minority scientific opinion for long time. The first scientifically and well publicized study on greenhouse effect dates back to 1970s. This can be taken to be year of knowledge. But in international political debate 1990 (year of first IPCC report) is accepted. So, between 1970 and 1990 the period of cost of adaptation and loss and damage should be located. It is proposed to be taken as 1980.

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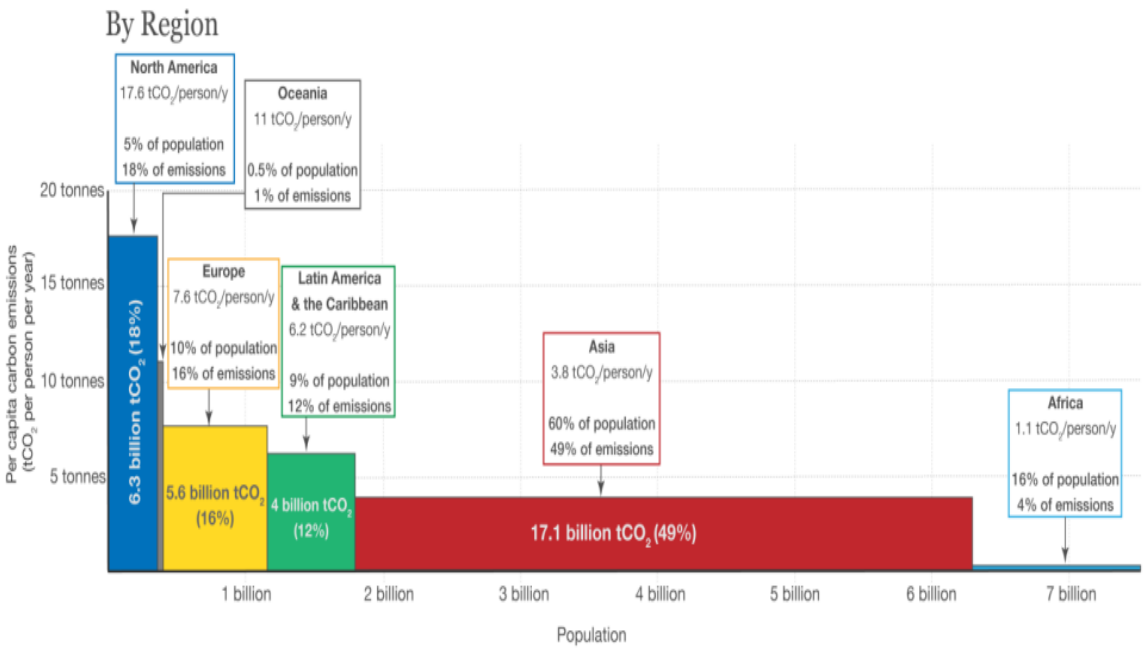
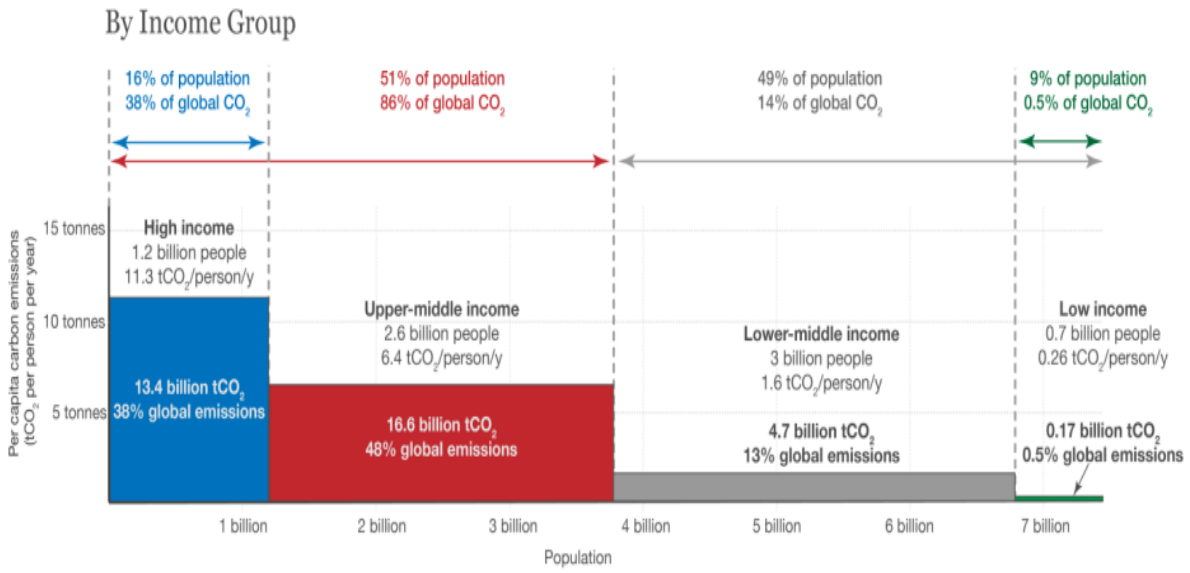


Source: Our World in Data63

The **"Beneficiary Pays" Principle** takes three simultaneous routes for distribution the costs of adaptation, losses and damages and mitigation and benefits: a) the cost of adaptation and losses and damages be distributed among those who have benefitted from past emissions; b) the remaining cost i.e., cost of mitigation be distributed among all in inverse proportion to the benefits that each country has derived from past emissions; c) the benefits derived from past emissions are to be shared by all states equally (Figure 4). But this is wrong principle to follow because: a) like polluter pay principle it presupposes entitlements that one should not be entitled to more; b) it takes the present inequality regardless of specific history as reason to share burdens and for redistribution of benefits. So presently any country that is wealthy irrespective of its contribution in past emissions to share the burden. It means if Italy (irrespective of its past emission contribution) is more affluent that Russia and Germany today should bear the burden more than Russia and Germany. It entails new principle i.e., ability-to-pay within it; c); the benefits arising from past emissions were intended for and by the present generation rather they were intended by past generation for themselves. So, making someone responsible for acts not intended is wrong; and d) it is difficult to assess which benefits to be considered and to what extent one has actually benefitted.

Figure 4: Global Carbon Dioxide Emissions based on World Bank Income Level in 2016

[63]Available at: https://ourworldindata.org/co2-by-income-region (last visited Jul 22, 2020).



Source: Our World in Data64

"Ability-to-Pay" Principle is completely different principle than above three as it is *ahistorical*. This principle states that all the costs i.e., costs of adaptation, losses and damages as well as of mitigation be borne by all in proportion to their level of prosperity keeping in mind the sufficiency threshold. This finds reference in UNFCCC in the form of *respective capabilities*. Table 1 shows three different solutions for sharing burden by three countries having different ability to pay. Assume that the three countries have to share the burden of financing a renewable energy project which costs 60 units. Also assume that 10 units are required for subsistence. Out of three solutions, the best solution is solution 3. Because out of total income i.e., 90, 60 units have to be contributed (2/3rd share). So, let the 2/3rd burden be shared by all countries but this burden allows the maintenance of subsistence and leaves more future growth also. But this principle is deeply flawed as: a) it fails to take into consideration that few countries have contributed more to pollution; b) it considers the state's ability to pay and not individual's ability to pay. So, it might happen that a person in India might be more affluent than a person in U.S.A. Morally ability to pay is plausible on individual basis and not average state basis; c) it might happen that somebody who is affluent has resorted to eco-friendly means always and never polluted in anyway. So, it requires something called "Supererogatory requirement" which is not morally tenable.

Table 1: Distribution Solution on basis of Ability- to-pay Principle

[64] *Ibid.*

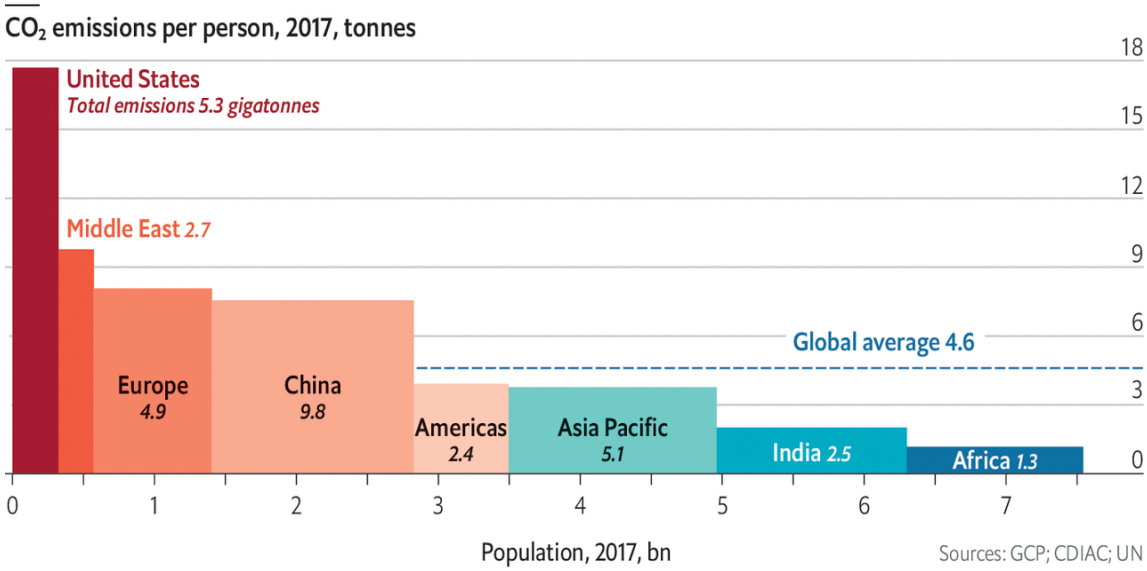
Country	Income	Solution 1 Burden Remainder	Solution 2 Burden Remainder	Solution 3 Burden Remainder
Country A	60	20 40	30 30	2/3 (60-10) = 33 27
Country B	40	20 20	20 20	2/3 (40-10) = 20 20
Country C	20	20 0	10 10	2/3 (20-10) = 7 13

"Emissions Egalitarianism" principle is used to provide most simple and practical solution to the problem of distributing the remaining emissions. It provides that remaining emissions should be distributed among all *individuals* equally. This principle divides the emission budget needed to avoid dangerous climate change by number of individuals living on the planet in order to get the permissible limit of emission per person per year. For example, some studies[65] have calculated this number to be 1 ton of carbon dioxide per person per year. So, everybody will get 1 ton of carbon dioxide per person per year for maintaining their lifestyle. This individual budget is currently distributed unequally (Figure 5). But this principle is not at all morally correct because: a) being a simple and practical solution does not make it morally correct; b) historical contributions to emissions have not been considered at all; c) moreover countries due to their affluence can develop such technologies by which people belonging to these countries can satisfy their desire within 1 ton of carbon dioxide easily. Whereas person

[65]German Advisory Council on Global Change (hereinafter WBGU), *Solving the climate dilemma: The budget approach: Special Report*, 58 P., German Advisory Council on Global Change (WBGU), Berlin (January 2009), available at: https://www.researchgate.net/publication/259472131_Solving_the_climate_dilemma_The_budget_approach (last visited on Jan 11, 2020).

in less affluent countries may not be able to satisfy their needs even. For example, in equatorial region especially African countries will face extreme warming due to climate change and thus air condition will become a necessity for them. Devoid of eco-friendly technology they have to survive in heat within 1 ton of carbon budget per person; d) the benefit of wealth transfer is not emission egalitarianism but emission trading. Emission trading will be part of any principle in which industrialized countries get less than they expect; and e) last but not the least, atmosphere belongs to nobody in the first place. And if the argument is taken that it belongs to everybody then equal ownership does not always lead to equal rights of use.

Figure 5: Unequal Distribution of Emissions per person per year



Source: Global Carbon Project, Carbon Dioxide Information Analysis Center, United Nations[66]

III. Conclusion

These five solutions are not individually viable but their perfect mix will hold 'moral feet' on all justice requirements be it historical underpinnings or distribution of different goods on basis of different considerations. Barring grandfathering, beneficiary pay principle and emission egalitarian, both polluter pay principle and ability to pay principle provide solution to all justice issues. Both the principles impose majority cost on industrialized north. This mix will become easier if one focuses on distribution of cost of mitigation, adaptation and losses and damages by keeping in mind that good to be distributed is benefits derived from emissions and not emissions. This is morally correct also. A perfect mix will involve following strategy in

[66]Available at: https://cdiac.ess-dive.lbl.gov/GCP/; Also see "Global warming 101: The past, present and future of climate change" The Economist (21 September, 2019), available at: https://www.economist.com/briefing/2019/09/21/the-past-present-and-future-of-climate-change (last visited on Aug 15, 2020).

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distributing the costs:

- First, due to past emissions (that were emitted knowingly from 1980) certain losses and damages are bound to occur. To meet these costs of adaptation and compensation, the polluter pay principle be applied as most of the emissions occurred in past 30-40 years and people aging in this range are still alive. But this cost should be limited to a threshold i.e., sufficiency limit.
- Second, all other cost (mitigation costs and rest of adaptation and compensatory costs for emissions prior to 1980 and which are left by first step) will be borne according to ability principle. Ability-to-pay principle should be seen in light of distribution of benefits derived from emissions. So, if person 'A' produces 0.5 ton of carbon dioxide per year and person 'B' produces 1 ton of carbon dioxide per year to get same benefit (such as food, work, heating, cooling and health), there is nothing unfair in this as both are achieving sufficiency threshold. 'A' has benefit of technology. Applying ability principle, a way to clean development while fairly distributing global prosperity (not average but per person) is not difficult at all.

Such climate policy will bring a perfect mix of development issues and environmental issues when dealt through the lens of human rights approach.

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