

What Obligations do Developed Countries Have to Assist Developing Countries in Adapting to and Mitigating Global Warming?

Temesgen Abebe Degu

Wachemo University, Law School, Hossana, ETHIOPIA

Received: 23 June 2022 ▪ Revised: 21 August 2022 ▪ Accepted: 29 August 2022

Abstract

Global warming is serious and irreversible threat that requires urgent action including adaptation and mitigation. Many developing countries, nevertheless, have less adaption and mitigation capacities but suffer first and worst from global warming, to which they contributed the least. Developing countries should take action only if developed countries provide them with adaptation and mitigation assistance. This article examines what obligations developed countries have in this regard, and why. Accordingly, Sec-II deals with the need for adaption and mitigation. Sec-III dwells on how to tackle global warming. Sec-IV explores the obligation of developed courtiers to provide adaptation and mitigation assistance. The last section concludes the essay.

Keywords: climate change, adaptation, and mitigation.

1. Why do we adapt to and mitigate global warming?

Global warming [also, climate change¹] is a phenomenon of increase in average global temperature resulting from the concentration of greenhouse gasses [GHGs²]. According to scientists, warming of the globe is unequivocal as evidenced by rise in atmospheric temperature, sea-level and snow melting. It is very likely [above 90% probability] that most of the warming

¹ Climate change refers to “change of climate which is attributed 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 comparable time periods” [United Nations Framework Convention on Climate Change, FCCC/INFORMAL/84 GE.05-62220 (E) 200705, (1992) United Nations, Art. 1(2); cf. Intergovernmental Panel on Climate Change (IPCC) (2007). Fourth Assessment Report: Climate Change: Synthesis Report, p. 30, available at: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf]. Climate change is more boarder than global warming in that it refers to the alteration of the climate system including both warming and cooling of the atmosphere [Stephen M. Gardiner (2004). Ethics and Global Climate Change. *Ethics*, 114(?), 555, pp. 558-559].

² The six GHGs include Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF₆) [Kyoto Protocol to the United Nations Framework Convention on Climate Change, UN Doc FCCC/CP/1997/7/Add.1, Dec. 10, 1997; 37 ILM 22 (1998) United Nations, Annex A].

since the mid-20thC resulted from anthropogenic activities. Devastating catastrophes will occur if current emission pattern continues. While global temperature rise above 2°C will cause more flood, drought and starvation, a 4°C rise even threatens human survival.³ The “Earth [and] creation [...] are in imminent peril”.⁴ Species and ecosystem across the world are also already being affected.⁵ Urgent response including both mitigation⁶ and adaptation⁷ is, thus, indispensable as shown in what follows.

But climate skeptics argue that global warming is uncertain and less serious problem to which huge economic resources should not be sacrificed.⁸ This, however, goes against the climate economics and science.⁹ Studies indicate that tackling global warming costs 2% of the global GDP.¹⁰ Moreover, uncertainty does not mean that there is no risk. While risk is the probability of an event and its consequences, uncertainty relates with inadequacy of evidence.¹¹ Putting the impact of global warming in terms of probability with some uncertainty cannot preclude catastrophic incidences.¹² Preventive action shall be taken even against uncertainty. According to the precautionary principle, scientific uncertainty should not excuse inaction where serious and irreversible threats exist.¹³ Global warming has already become irreversible and will

³ Intergovernmental Panel on Climate Change (IPCC). (2007). *Supra* note 1, pp. 45-48.

⁴ James Hansen (2009). *Storms of My Grandchildren: The Truth about the Coming Climate Catastrophe and Our Last Chance to Save Humanity* (Bloomsbury: London), ix, quoted in Sam Adelman. *Re-Imagining Climate Justice in the Ecology of Knowledges*, in *Re-Imagining Our Sociological Contemporaneity: What is the Age of Re- Embodiments?* (Glasshouse, 2011), p. 1].

⁵ Rosenzweig et al. (2007). *Assessment of Observed Changes and Responses in Natural and Managed Systems*. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, pp. 94-104.

⁶ Mitigation is the reduction of emission from sources and/or the removal thereof using sinks [IPCC, 2001a, *Climate Change 2001: Synthesis Report*. A Contribution of Working Groups I, II, III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge and New York, p. 398].

⁷ Adaptation refers to minimizing the negative impacts of global warming and/or exploiting positive aspects thereof [Id.]

⁸ Bjorn Lomborg (2007). *Cool It: The Skeptical Environmentalist's Guide to Global Warming*. Knopf Publishing Group, United States, cited in Frank Ackerman (2008). *Hot, it's not: Reflections on Cool It*, by Bjorn Lomborg. *Earth and Environmental Science*, 89(3-4), 435, pp. 435-36.

⁹ Frank Ackerman. (2008). *Supra* note 8, pp. 437-39.

¹⁰ Nicolas Stern. (2007). *Stern Review on the Economics of Climate Change*. HM Treasury, London [Available at http://www.hm-treasury.gov.uk/sternreview_index.htm].

¹¹ Kirsten Halsnæs et al. (2007). *Framing issues*. In *Climate Change 2007: Mitigation*. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, p. 131 [Also, Timothy R. Carter et al. (2007). *New Assessment Methods and the Characterization of Future Conditions*. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, p. 139].

¹² *Id* at pp. 128 and 131.

¹³ United Nations Framework Convention on Climate Change. *Supra* note 1, Art. 3(3); Rio Declaration on Environment and Development, UN Doc. A/Conf151/5/Rev.1, UN Conference on Environment and Development (1992), United Nations, Principle 15 [Also, Christian Gollier et al. (2001). *Should we beware of the Precautionary Principle?* *Economic Policy*, 16(33), 30, pp. 308-10].

'hit the fan' within 20 years.¹⁴ If not, it will become so after a decade where it will be too late to act.¹⁵ Hence, global average temperature shall be stabilized at/below 2°C, which means that GHGs emission shall not exceed above 350 ppm.¹⁶ Studies propose an emission reduction of 60% to 80% against the 1990 base year.¹⁷

Mitigation, however rigorous, cannot totally avoid the future dire consequences of global warming owing to the present huge accumulation of GHGs and their longer duration. Relying only on mitigation will make adaptation impossible or excessively costly in the long-term.¹⁸ Adaptation is also inevitable now, not least because the impacts of global warming are already occurring.¹⁹ "Neither adaptation nor mitigation alone can avoid all climate change impacts; however, they can complement each other and together can significantly reduce the risk of climate change".²⁰

It is worth addressing herewith which countries ought to take action. As indicated, we have little time before environmental catastrophe occurs. This means that the 350 ppm target should be met promptly and effectively. This cannot, however, be achieved with the effort of developing countries only. To be effective, developing nations, esp. major emitters,²¹ have to cut their emission. Developing countries cannot follow the growth path of industrialized nations for it will bring environmental catastrophe.²² Global warming requires a concerted action as it is a global problem. All states have common responsibility to protecting common resources [ex. climate].²³ Leaving developing countries [major emitters] from binding emission commitment fundamentally impedes planetary justice.²⁴ Thus, the 350 ppm target should be allocated to all countries, including major developing country emitters, according to their level of emission. The following section addresses how countries can adapt to and mitigate global warming.

¹⁴ James Lovelock. 'Enjoy Life while you can'. The Guardian, 1 March 2008; available at: www.guardian.co.uk/theguardian/2008/mar/01/scienceofclimatechange.climatechange [Accessed on 24 May 2012].

¹⁵ UNDP (2007). Fighting Climate Change: Human Solidarity in Divided World, Human Development Report 2007/2008, UNDP, New York, USA, pp. 21-23.

¹⁶ James Hansen et al. (2008). Target Atmospheric CO₂: Where Should Humanity Aim? P. 1, Available at: http://www.columbia.edu/~jeh1/2008/TargetCO2_20080407.pdf [Accessed on 25 May 2012].

¹⁷ Intergovernmental Panel on Climate Change (IPCC) (2007). Supra note 1, pp. 64-68.

¹⁸ Richard J. T., Klein et al. (2007). Inter-relationships between adaptation and mitigation. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, p. 748.

¹⁹ Jens Hesselbjerg Christensen et al. (2007). Regional climate projections. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, pp. 847-940.

²⁰ Intergovernmental Panel on Climate Change (IPCC). Supra note 1, p.65.

²¹ Among developing countries, China, India, South Korea, Mexico, Indonesia, and South Africa have joined the top 20 global carbon emitters [Kevin A. Baumert et al. (2005). Navigating the Numbers: Greenhouse Gas Data and International Climate Policy. World Resource Institute, USA p. 12].

²² Henry Shue. (1999). Global Environment and International Inequality. *International Affairs*, 75(3), 531, p. 531.

²³ Rio Declaration on Environment and Development. Supra note 13, principle 7, United Nations Framework Convention on Climate Change. Supra note 1, Art. 3(1) [Philippe Sands. (2004). Principles of International Environmental Law, 2nd Ed., Cambridge University Press, Cambridge, pp. 286-87].

²⁴ Sam Adelman. Supra note 4, pp. 3-4, note 8.

2. Adaptation and mitigation: Ways and determinants

Mitigation takes place at global level and its benefits are, principally, global.²⁵ The main mitigation tools include market mechanisms [ex. emission trading, clean development mechanism, CDM] technological innovation [ex. improving energy efficiency, deploying low/zero-carbon technologies, developing carbon sequestering technology].²⁶ Another way includes conserving forests, land and terrestrial ecosystem and enhancing the same to sequester carbon which deserves caution since their duration is prone to disturbances, though.²⁷

Adaptation, conversely, takes place at local or national levels and its benefits, principally, go to the same levels.²⁸ It is taken, particularly, in relation with water, agriculture, infrastructure, human health, and energy to cope up with global warming.²⁹ Examples include enhancing water storage and conservation, using climate resilient seeds, rotating crops, improving land management, building seawalls and flood-barriers, deploying climate sensitive medical service and surveillance, and diversifying energy sources and using renewable energy. The CDM project is designed to enhance adaptive capacity in developing countries by promoting sustainable development in such areas.³⁰

According to the mainstream approach, mitigation and adaptation should be taken in accordance with sustainable development.³¹ Such is the case by integrating economic, social and environmental priorities in development policies. This can be done by greening the economy, for example, by improving energy efficiency and lowering carbon use.³² However, sustainable development [and green economy] seek to sustain the market while leaving environmental protection on market, technological and scientific optimisms,³³ though global warming is the greatest market failures.³⁴ Global warming is a crisis of both growth model based on

²⁵ Richard J.T. Klein et al. (2007). Supra note 18, p. 750 [Harald Winkler et al. (2007). What Factors Influence Mitigative Capacity? *Energy Policy*, 35(?), 692, p. 694].

²⁶ Intergovernmental Panel on Climate Change (IPCC) (2007). Supra note 1, pp. 58-61 [also, Kyoto Protocol to the United Nations Framework Convention on Climate Change. Supra note 2, Arts. 2(1) and 17; and UNDP. (2007). Supra note 15, pp. 125-147].

²⁷ Michael Apps et al. (2001). Technological and Economic Potential of Options to Enhance, Maintain, and Manage Biological Carbon Reservoirs and Geo-engineering. Contribution of Working Groups III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, pp. 316-322.

²⁸ Richard J. T., Klein et al. (2007). Supra note 18, p. 750 [Harald Winkler et al. (2007). Supra note 25, p. 694].

²⁹ Intergovernmental Panel on Climate Change (IPCC) (2007). Supra note 1, p. 57.

³⁰ Kyoto Protocol to the United Nations Framework Convention on Climate Change. Supra note 2, Art. 12. [UNCCD. The Climate Change Mitigation and Adaptation Information Kit: Linkages Between The United Nations Framework Convention on Climate Change (UNFCCC) and United Nations Convention to Combat Desertification (UNCCD), pp. 15-17, available at:

http://www.global-mechanism.org/dynamic/documents/document_file/ccesinfokit_web-1.pdf [Accessed on, 27 May 2012].

³¹ United Nations Framework Convention on Climate Change. Supra note 1, Arts. 2 and 3(4). [World Bank. (2008). Development and Climate Change: A Strategic Framework for the World Bank Group, Technical Report, World Bank, Washington, DC, p. 7; and Harald Winkler et al. (2007). Supra note 25, p. 694].

³² UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication – A Synthesis for Policy Makers, pp. 1-5 [available at: www.unep.org/greeneconomy].

³³ Sam Adelman. Supra note 4, pp. 5-6 [Also, Subhabrata Bobby Banerjee. (2003). Who Sustains Whose Development? Sustainable Development and the Reinvention of Nature□, *Organization Studies*, 24(1), 143, pp. 154-57].

³⁴ Nicolas Stern (2007). Supra note 10.

overconsumption, commodification and profit, and ecological limits.³⁵ “[W]e are consuming nature’s services [...] 44% faster than nature can regenerate and reabsorb [...]. [I]t takes the Earth almost 18 months to produce the ecological services that humanity uses in one year.”³⁶ Central to unrestrained growth is the idea of making life comfortable.³⁷ But high consumption in excess of meeting basic needs does not bring life-satisfaction. Prosperity is the ability to flourish psychologically and socially, for example, by contributing useful work to the community. We should and can flourish within ecological limits.³⁸ Climate justice, inter alia, demands that nature deserves protection in itself.³⁹ To meet the 350 ppm target, the remaining fossil-fuel should never be emitted, among others.⁴⁰

But developing countries, particularly the poor, have no/less mitigation and adaptation capacities. Mitigation and adaptation capacities, generally, depend on economic, technological and institutional factors. These are the main barriers faced by many developing countries, particularly the poor in addition to the prevailing high poverty.⁴¹ It is, hence, inappropriate to demand developing countries to stop growth. Growth to the extent necessary to meet basic needs should continue. Although basic need varies across place and time, it generally refers to food, shelter, clothing, health care.⁴² Still, growth to meet basic needs should be clean. This requires provision of adequate finance, clean technologies and institutional assistance by developed countries. We should balance between the development needs of poor countries and environmental conservation, to reach at equitable burden sharing.⁴³

Developed countries are not, however, committed to provide adequate financial, technological and institutional assistance to developing countries.⁴⁴ For instance, they promised to provide only \$ 30 billion for the years 2010 to 2012.⁴⁵ This stands in sharp contrast to what many developing countries requested. The Africa Group, for instance, requested a minimum of \$ 67 billion/year for adaptation and \$ 200 billion for mitigation by 2020 which is only 0.5% of

³⁵ Sam Adelman. *Supra* note 4, pp. 2 and 4-6.

³⁶ Andrew Simms & V. Johnson (2010), *Growth isn’t Possible: Why We Need a New Economic Direction*, New Economics Foundation (nef), p. 5.

³⁷ *Id.* at p. 8.

³⁸ Tim Jackson (2009). *Prosperity without Growth? The Transition to a Sustainable Economy*. Sustainable Development Commission, pp. 30, 86 and 88.

³⁹ Sam Adelman. *Supra* note 4, p. 6

⁴⁰ James Hansen et al. (2008). *Supra* note 16, pp. 1-2.

⁴¹ Richard J.T. Klein et al. (2007). *Supra* note 18, p. 763; Harald Winkler et al. (2007). *Supra* note 25, pp. 695-700; and David S. G. Thomas and Chasca Twyman. (2005). *Equity and Justice in Climate Change Adaptation amongst Natural-Resource-Dependent Societies*. *Global Environmental Change*, 15(?), 115, p. 116.

⁴² Amartya Sen (1993). *Capability and Well-Being*, pp. 50-51, in Martha Nussbaum and Amartya Sen (Eds.), *The Quality of Life*, World Institute for Development Economics Research (WIDER), Oxford [also, Henry Shue. (1999). *Supra* note 22, p. 544].

⁴³ Henry Shue (1999). *Supra* note 22, p. 531.

⁴⁴ United Nations Framework Convention on Climate Change. *Supra* note 1, Arts. 3(5), 4(1)(c), 4(1)(e), 4(1)(g), 4(1)(h), 4(5) and 5(b).

⁴⁵ Copenhagen Accord, Draft decision-/CP.15, FCCC/CP/2009/L.7, Framework Convention on Climate Change (2009) United Nations, par. 8. [see also, Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action, Draft decision -/CP. 17 (2011) [Available at: http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cop17_durbanplatform.pdf].

Annex-II parties GDP.⁴⁶ But they worked hard to solving the recent credit crunch warming which shows that the market is the winner.⁴⁷ Developing countries should accept binding commitments only if the developed are committed to provide adequate assistance as will be argued in the following section.

3. Do developed countries have obligation to assist developing countries?

Though all countries have shared responsibility to protecting common resources, the level of their responsibility should be differentiated having regard to equity. The extent of responsibility shall take into account differences in contributions, capacity, vulnerability, and special needs.⁴⁸ “[Global warming] exacerbates existing injustices and perpetrates new ones, not least against the people of the global South, who are least responsible for GHGs emission and have the fewest resources for adaptation and mitigation [but are] most vulnerable.”⁴⁹ Developing countries, particularly low-latitude and less-developed, are more vulnerable to global warming because of their higher sensitivity to impacts and lack of resources [poverty].⁵⁰ Partly, this is associated with their geographical location.⁵¹ Global warming, inter alia, reduces agricultural productivity and income which again worsens human development [nutrition, health] and deepens poverty.⁵² Global warming [as part of climate justice] is also an issue of global justice since it widens poverty and inequality.⁵³ As such, two forms of generational injustices, intragenerational and intergenerational, are central to global warming. The burden of global warming should, thus, be shared according to the principle of climate justice which includes reparative, retributive, and distributive justice.⁵⁴

The first reason to oblige developed countries to provide means of adaptation and mitigation flows from their past activities. Developed countries have had high past carbon emission, the impacts of which are disproportionately borne by poor nations.⁵⁵ As GHGs stay for long in the atmosphere, so does their impacts.⁵⁶ For instance, more than 200 million people in poor nations were annually affected by climate related impacts like drought and flood between

⁴⁶ Nicola Cantore et al. (2009). Climate Negotiations and Development: How can Low-Income Countries gain from a Climate Negotiation Framework Agreement? Working Paper No. 312, Overseas Development Institute, Westminster, p. 4.

⁴⁷ Joseph Maria Antentas (2012). No More “Green Capitalism”: An Assessment of the Failure of the Durban Summit on Climate. Committee for the Abolition of Third World Debt, available at <http://www.cadtm.org/No-More-Green-Capitalism> [Accessed on 29 may 2012].

⁴⁸ Philippe Sands (2004). Supra note 23, pp. 287-289.

⁴⁹ Sam Adelman. Supra note 4, p. 1.

⁵⁰ Stephen H., Schneider et al. (2007). Assessing key vulnerabilities and the risk from climate change. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, p. 796 [Also, UNDP. (2007). Supra note 15, pp. 79-81].

⁵¹ Sam Adelman. Supra note 4, p. 7, note 13.

⁵² UNDP (2007). Supra note 15, pp. 81-95.

⁵³ Sam Adelman. Supra note 4, at p. 1.

⁵⁴ Id. at pp. 2 and 7-8.

⁵⁵ Developed countries accounted for 83.8% of the cumulative industrial emission from 1800 to 1988. [IPCC, Climate Change 1995: Economic and Social Dimensions of Climate Change, Contribution of Working Group III to the Second Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, p. 94].

⁵⁶ Axel Gosseries (2004). Historical Emission and Free-Riding. *Ethical Perspective*, 11(1), 36, pp. 37-38.

1998 and 2008.⁵⁷ Studies indicate that droughts are occurring more frequently in areas such as sub-Saharan Africa.⁵⁸ Hence, the non-recognition of historical responsibility under the climate change convention undercuts the full realization of climate justice. Reparative justice demands that states should be responsible for past emission.⁵⁹ Developed countries are bound to fix the damages they had caused and redress their historical emission debts.⁶⁰ Polluters should pay if retributive justice is to be realized, too.⁶¹

But many developed countries deny historical responsibility.⁶² It is morally wrong to claim responsibility when people did not [cannot be expected to] foresee the effects of emission in the past.⁶³ Studies, however, started warning the adverse effects of industrialization so early that innocence cannot be claimed.⁶⁴ Though it is unfair to punish ignorant people, it is not unfair to make them pay costs of the damages following their acts.⁶⁵ It is counter-argued that the past polluters are no more alive; hence, it is unfair to make present generations liable who even had no control over past activities. But states should be accountable for activities within their territory despite generational gaps.⁶⁶

Moreover, present generations of developed countries are beneficiaries of industrialization [ex. technology] while developing countries bear the burden. To restore equality, the former should assume extra-burden equivalent to what they had benefited.⁶⁷ Arguably, current inhabitants of rich countries cannot be responsible for the past since they were involuntarily benefited. Developing countries have also gained benefits from past emission.⁶⁸ But this is unjustifiable free-riding. It is unfair to reap benefits without bearing its burden. Not only developing countries received disproportionate benefits but also, they were charged.⁶⁹ Some argue that historical and benefits approaches are impracticable since it is difficult to translating such

⁵⁷ Kirsten Halsnæs and Nethe Veje Laursen (2009). *Climate Change Vulnerability: A New Threat to Poverty Alleviation in Developing Countries*, pp. 83-84, in Simin Davoudi et al. (Eds.), *Planning for Climate Change: Strategies for Mitigation and Adaptation for Spatial Planners*, Earthscan, London.

⁵⁸ Intergovernmental Panel on Climate Change (IPCC) (2007). *Supra* note 1, pp. 30-32 [UNDP. (2007). *Supra* note 15, p. 78].

⁵⁹ United Nations Framework Convention on Climate Change. *Supra* note 1, preamble, par. 3 and Art. 3 [Sam Adelman. *Supra* note 4, p. 2 and p.3, note 7].

⁶⁰ Henry Shue (1999). *Supra* note 22, pp. 533-537; and Eric Neumayer (2000). In Defense of Historical Accountability for Greenhouse Gas Emissions. *Ecological Economics*, 33(?), 185, 185-192.

⁶¹ Sam Adelman. *Supra* note 4, p. 2

⁶² See for example, George W. Bush, re-quoted in Stephen M. Gardiner (2004). *Supra* note 1, p. 578 [See also, Larry Parker and John Blodgett (November, 2008). *Greenhouse Gas Emissions: Perspectives on the Top 20 Emitters and Developed Versus Developing Nations*, CRS Report for Congress, Order Code RL32721, CRS, pp. 3-4].

⁶³ Jeremy Moss (2009). *Climate Justice*, p. 58, in Jeremy Moss (Ed.), *Climate Change and Social Justice*, Melbourne University Press, Melbourne.

⁶⁴ Henry Shue (1999). *Supra* note 22, p. 536 [By 1896, it was predicted that burning coal generates CO₂ which in turn increases Earth's temperature [Svante Arrhenius (1896). *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground*. *Philosophical Magazine and Journal of Science*, 41(5), 237, pp. 266-67 & 270]].

⁶⁵ Henry Shue (1999). *Supra* note 22, pp. 535-36.

⁶⁶ Jeremy Moss (2009). *Supra* note 63, pp. 53-55.

⁶⁷ Henry Shue (1999). *Supra* note 22, pp. 533-4 & 536 [also, Eric Neumayer (2000). *Supra* note 59, p. 189].

⁶⁸ Robert Nozick (1974). *Anarchy, State and Utopia*, Basic Books, Blackwell, Oxford, p. 93; and Jeremy Moss. (2009). *Supra* note 62, pp. 55-57.

⁶⁹ Axel Gosseries (2004). *Supra* note 56, pp. 47-8; and Henry Shue (1999). *Supra* note 22, pp. 534-535.

responsibility into specific allocations.⁷⁰ It is not too hard to overcome such practical question given that countries were able to redistribute money under the post World-War-II Marshall Plan without prior existing formula.⁷¹

Others argue that those who are capable should bear the burden of global warming since there is resource disparity among countries.⁷² Contribution towards a common goal should progress in proportion to possessed resources.⁷³ Many in developing countries struggle with poverty to meet their basic needs while their counterparts in developed countries lead luxurious life. It is unjust to demand the poor to sell their blankets so that the rich keep their jewelry.⁷⁴ Fairness even requires that developed countries should provide the resources to guarantee minimum needs of people in developing countries.⁷⁵ After all, the millennium development goal aims to eradicate poverty without undermining environmental sustainability.⁷⁶ From human rights perspective, too, individuals have the fundamental interest to be protected against the ill-effects of global warming.⁷⁷

It is, arguably, unfair to require members of one state to assist their counterparts in another. Even if they are capable, they have no obligation to assist if they did not harm or hinder others.⁷⁸ This is implausible since environmental problems are primarily caused by developed countries. The conventional conception of space and liberal theories of justice do not fit with the transboundary nature of GHGs.⁷⁹ Developed countries have used more than their equitable share of the atmosphere both through industrialization and their present lifestyle. They should compensate developing countries for such overuse.⁸⁰ Moreover, those capable to prevent others sufferings [ex. starvation], without significant loss, are morally obliged to provide assistance regardless of their geographical location. Luxurious spending should be given for starving people. This is not charity but a moral obligation, not least because not doing so is wrong in a situation where some are affluent while others starve.⁸¹

To capture the full dimension of the current climate injustice, it is worth focusing on impoverishment instead of poverty. Developing countries were victims of colonialism, political

⁷⁰ Jeremy Moss (2009). *Supra* note 63, p. 57 [and Martino Traxler (2002). Fair Chore Division for Climate Change. *Social Theory and Practice*, 28(?), 101-34, cited in Stephen M. Gardiner (2004). *Supra* note 1, p. 582].

⁷¹ Stephen M. Gardiner (2004). *Supra* note 1, p. 582, note 86.

⁷² Jeremy Moss (2009). *Supra* note 63, pp. 58-62.

⁷³ Henry Shue (1999). *Supra* note 22, p. 537.

⁷⁴ Henry Shue (1992). *The Unavoidability of Justice*, in Andrew Hurrell and Benedict Kingsbury (Eds.), *The International Politics of the Environment*, Oxford University Press, Oxford, Quoted in Stephen M. Gardiner. (2004). *Supra* note 1, p. 578.

⁷⁵ Henry Shue (1999). *Supra* note 22, p. 541.

⁷⁶ United Nations Development Program (UNDP), the Millennium Development Goals [available at <http://www.undp.org/content/undp/en/home/mdgoverview.html>].

⁷⁷ Simon Caney (2005). *Cosmopolitan Justice, Responsibility, and Global Climate Change*. *Leiden Journal of International Law*, 18 (?), 747, p. 768.

⁷⁸ Richard W. Miller (1998). *Cosmopolitan Respect and Patriotic Concern*. *Philosophy & Public Affairs*, 27(3), 202, pp. 220-24 [also, Jeremy Moss. (2009). *Supra* note 63, p. 60].

⁷⁹ Henry Shue (1999). *Supra* note 22, p. 542; and Sam Adelman. *Supra* note 4, pp. 1-2.

⁸⁰ Anil Agarwal et al. (2002). *The Global Commons and Environmental Justice-Climate Change*, p. 173, in John Byrne et al. (Eds.), *Environmental Justice: International Discourses in Political Economy: Energy and Environmental Policy*, Transaction Publishers, New Jersey.

⁸¹ Peter Singer (1972). *Famine, Affluence and Morality*. *Philosophy and Public Affairs*, 1(3), 229, pp. 231-232 235-238.

domination and economic exploitation of the developed.⁸² Such kind of unbalanced power relationship lies behind their impoverishment. Impoverishment, in turn, is the root cause of developing countries' lack resource to cope up with global warming; hence, of the injustice.⁸³ In light of distributive justice, such "legacy of colonialism and depredations of developmentalism" are of central concern.⁸⁴ Developed countries, thus, owe huge responsibility to provide resource for adaptation and mitigation with the view to redressing what they have exploited. Only then can we fully realize climate justice.

Response to global warming should also take into account the benefits of future generations. Global warming pertains to intergenerational justice since unsustainable growth deprives the legitimate expectations of future generations; hence, raises reparative justice.⁸⁵ Global warming harms vital human interests [ex. life] that are worthy enough to impose obligation on others to reduce emission. Despite the obscurity of their identities and interests, future generations clearly have certain interests which we can affect now, not least because they are 'full humans with human needs'.⁸⁶ So, they deserve protection against the ill-effects of global warming.

4. Conclusion

According to the science, surface temperature should be maintained at 2°C by stabilizing GHGs at 350 ppm. To effectively realize this target and achieve climate justice, all countries including major developing emitters should cut their emission.

However, developing countries are not only highly vulnerable to global warming but also are less able to adapt to and mitigate thereof despite their least contribution. Developed countries should provide them with adaptation and mitigation assistance. The burden of global warming should be shared with in the context of climate justice including reparative, retributive and distributive justice.

Developed countries have had high historical emission whose benefits are reaped by their present generations while the cost goes to poor nations. Reparative justice cannot be achieved without the developed countries taking responsibility for past emission. Many people in developing countries struggle with poverty while others in developed countries lead affluent life. This also goes at the center of global justice as global warming perpetuates existing inequality and creates new ones. So, the wealthy countries should pay the cost of responding to climate change. Cosmopolitanism requires that people in developed countries have moral obligation to the needy in other countries. Moreover, at the center of the present injustice lies the impoverishment of developing countries through colonialism, political domination and economic exploitation. This is a compelling reason for resource redistribution from the developed to the developing countries.

⁸² Anibal Quijano (2000). Coloniality of Power, Eurocentrism, and Latin America. *Nepantla: Views from South*, 1(3), [Translated by, Michael Ennis], 533, pp. 534-550.

⁸³ Sam Adelman. *Supra* note 4, p. 7.

⁸⁴ *Id.* at p. 2.

⁸⁵ *Id.* at p. 8 [Also, United Nations Framework Convention on Climate Change. *Supra* note 1, Art. 3(1); and Philippe Sands (2004). *Supra* note 23, pp. 256-257].

⁸⁶ Simon Caney (2006). Cosmopolitan Justice, Responsibility, and Global Climate Change. *Can. J. L. & Jurisprudence*, 19(2), 255, pp. 259-267.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public commercial, or not-for-profit sectors.

The author declares no competing interests.

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