Westphalian Sovereignty and the Free-Rider Conundrum in the Atmospheric Commons: Examining Global Governance Regimes for Addressing Climate Change Adaptation

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ABSTRACT

While key actors at the international level have made strides in attempts to address climate change through collective action, their efforts are often limited by the Westphalian construct of the modern state which prioritizes territorial sovereignty over global governance. Thus, even though it is commonly known that the atmosphere transcends sovereign territory, creating effective institutional and policy mechanisms for collective state action to govern it remains a major challenge. Indeed, despite the crafting of various international climate change governing frameworks after the Rio Earth Conference of 1992, greenhouse gas emissions have continued to increase, with the negative impacts of climate change already being experienced in various parts of the world. In this paper, we review published literature, secondary data and international policies to gauge the performance of the Kyoto Protocol and the Paris Agreement of 2015 in regulating national and global greenhouse gas emissions. Our assessment established that enforcing commitments made by various nation states at the international level is very difficult, mainly because the pursuit of national economic growth is accorded precedence over the imperative for reducing greenhouse gas emissions. This inevitably results in governance failures. It is also clear that the socioeconomic development imperatives of less developed economies are particularly compromised as they have the highest incentive to cooperate with global governance due to their vulnerability to climate change impacts, and yet they have the least capacity to emit greenhouse gasses because of the nature of their economies.

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BACKGROUND

In recent years, various parts of the world have witnessed a significant escalation of the negative impacts of climate change. This escalation has engendered a sense of urgency in the search for lasting solutions to the governance of the atmospheric commons. It is now well-known that the discovery of coal, oil, and gas in the 18th century dramatically transformed industrial production processes, and created vast new amounts of energy which enabled the building up of a physical capital stock, spurring unprecedented economic activity and advancement. Thus, fossil fuels have been powering economies for over 150 years but the energy they generated has also created greenhouse gas emissions (GHG), which were dumped into the atmosphere with no or little regard for its capacity to absorb the waste (see EESI, 2021). Since then, GHG concentrations in the atmosphere have gone through various peaks and lows. However, as from the mid-18th century when the industrial revolution started, GHG concentrations in the atmosphere have increased exponentially, with the annual rate of carbon dioxide (CO_2) increase in the atmosphere escalating 100 times faster than it did during the end of the last ice age (which was 11 000 to 17 000 years ago).[1]

The rate and scale of these increases have led to the current age being labelled the 'Anthropocene',[2] where geological time-scale changes are caused by anthropogenic activities in record time. In addition, the unprecedented levels of atmospheric CO_2 emissions have caused the earth's climate system to steadily change, such that the global mean temperature in 2020 was one of the three warmest on record at 1.2°C above the pre-industrial levels.[3] There are also strong indications that nature's natural ability to absorb carbon in the atmosphere is getting weaker (Luomi, 2020). Thus, one of the most consistent messages from the International Panel on Climate Change (IPCC)'s Assessment Reports has always been that global warming is no longer in doubt and that more emissions will increase the likelihood of severe and irreversible impacts on the earth's human and natural habitats (see IPCC, 2007; 2021). Indeed, during the past few decades, most of the key indicators of climate change have reached magnitudes unseen before, and are still changing at exponential rates (IPCC, 2021). Since climate change is mainly caused by anthropogenic GHG emissions, cooperation on governing the atmospheric commons has mainly revolved around managing or reducing the emissions of individual countries.

Efforts to establish an effective global climate change governance regime with universal applicability have been confronted by the resilience of the Westphalian construct of the modern state which prioritizes territorial sovereignty and national interests over global governance priorities. When facing demands for conformity to climate change governance frameworks crafted at the global level, most nation states often hide behind ideological justifications of wanting to have ultimate control over their own affairs, with the specific intention to exclude any other authorities from interfering in 'domestic politics' (see Walker, 1993; Caporaso, 2000). As a result, the free-rider conundrum in the governance of atmospheric commons has been an enduring barrier that makes it difficult for key players to reach international consensus on the best way to address the urgent imperative for different countries to reduce their GHG emissions. As Ostrom (2009) points out, efforts to reduce global GHG emissions have assumed a problematic collective action dimension that can only be dealt with at various scales. At the same time, key actors face challenges that arise from attempts to shift atmospheric governance from an open-access regime into a global commons regime.[4]

In this paper, we explore and articulate how the global climate change governance regimes arising from the United Nations Framework Convention on Climate Change (UNFCCC)[5] and its treaties, including the Kyoto Protocol[6] and the Paris Agreement of 2015[7] have fared in terms of regulating GHG emissions. The paper serves to bring more attention to bear on the building blocks for crafting more effective atmospheric commons policies, institutions and practices. It is intended to stimulate more debate and inform decision making on how best to develop national and international policy frameworks for governing the atmospheric commons.

THE INTERNATIONAL ARCHITECTURE FOR MITIGATION AND ADAPTATION

The international architecture for mitigation and adaptation to climate change is mainly anchored on the UNFCCC. However, a noticeable weakness is the fact that the UNFCCC does not have any provisions to bind parties to specific actions regarding the reduction of GHG emissions. The absence of binding provisions reflects the differences between countries with regards to what should be done, by who, and at whose cost to reduce GHG emissions. The United States of America refused to accept a binding emissions target, and hence the non-binding nature of the UNFCCC. However, under the UNFCCC, the parties introduced the Kyoto Protocol (2007) which specified GHG emission reduction targets for developed countries, including responsibilities for supporting climate change adaptation in developing countries (non-annex). The Kyoto Protocol's first commitment period expired in 2012, to be followed by a second commitment period that was scheduled to last until 2020. At the expiry of the first commitment period,

Canada signalled that it would not participate in post-Kyoto commitments because it realized that it was not going to realistically be able to meet those commitments within the confines of the timelines that had been specified. This resulted in other major emitters of GHGs (Russia, Japan and New Zealand) following suit. This put-paid to binding commitments, and informed the Paris Agreement (2015) which is based on voluntary 'contributions' by sovereign nations.

This brief history of the UNFCCC explains the massive challenges of managing the atmospheric commons, that have their roots in the Westphalian state system. The first challenge is that reducing GHG emissions has enormous costs on national economies. As the cost-benefit ratios have improved, willingness to invest in mitigation has also increased. In 2012, the Wall Street Journal argued that there was no compelling scientific argument for drastic action to reduce GHG emissions mainly because the climate science was incorrect and the financial impacts of climate change were very low, and hence, there was no need for concerted climate action.[8] The Paris Agreement reflects the second problem of collective action on the global atmospheric commons. It is a voluntary agreement, allowing countries to make commitments based on their own national circumstances, and increasing ambition periodically to ensure that their national contributions are sufficient to achieve the global goal of stabilizing the earth's climate system. The key difference between the Paris Agreement and the Kyoto Protocol is that the later allocated emissions targets to various countries based on the principle of common but differentiated abilities and national circumstances. This essentially recognized that industrialized nations bore most of the responsibility for cumulative GHG concentrations already in the atmosphere through their burning of fossil fuels since the beginning of the industrial revolution.

'Common but differentiated abilities' in turn mean that industrialized nations were required to mitigate their GHG emissions by, inter alia, adopting renewable energy-based technologies and improving their economic production standards. Non-Annex countries that were not facing similar requirements could continue to use the older technologies, giving them a competitive advantage on global markets. In addition, their ability to continue using older fossil fuel-based technologies would lead to a classic problem of leakage, affecting the competitiveness of industrialized economies, including their employment opportunities. Thus, national interests trumped global interests, which is a typical outcome of Westphalianism. The fact that the economies of some developing countries were growing at relatively faster rates prior to the global financial crisis of 2008 also meant that their exclusion from binding climate actions positioned them to 'free-ride' and benefit from the mitigation actions of industrialized countries. The potential for free riding in the context of a global economy characterised by competition between sovereign states led to the insistence by industrialized nations on an inclusive agreement with equal inputs from all nations based on their national circumstances.

In addition to the foregoing, as the impacts of climate change have become increasingly more apparent, industrialized nations have become more ambitions in terms of increasing their commitment to concerted actions in the context of the Paris Agreement. This has led to nations unilaterally putting in place policies that will transition their countries towards the so called 'net-zero' carbon emissions by year 2050. This signifies the recognition that mitigation costs are now viewed as less than the benefits of investing in new ways of industrial production and consumption. It may also reflect increasing pressure on governments by citizens and other key players to act more responsibly, to the extent that climate change has become a key factor in national politics and decision making. Perhaps more importantly, climate change mitigation policies still rely on market approaches and technocratic solutions. This indicates that the climate response has so far not necessarily sought to change existing social and global relations, but rather found ways of maintaining them, even advancing them, through technological innovations driven by the market. However, as Kaul et al (2003)[9] note, global public goods, such as a stable climate system, cannot be sufficiently dealt with through the market, but rather should be addressed through a more robust governance system.

A noticeable and persistent disjuncture is visible when one looks at the international commitments made and the road towards reaching the 1.5–2°C goal of the Paris Agreement. The IPCC has sent out a clear warning to the effect that greater GHG emissions reduction aspirations and targets are needed if the world is to avoid exceeding the 1.5°C threshold. Due to the different calculation methods and assumptions in existing models, there are many different estimates of the total carbon that can be absorbed by the atmosphere without irreversibly interfering with the earth's climate system. However, there is some agreement that in order to stay within the 1.5°C warming threshold proposed by the Paris Agreement, the remaining carbon budget will be 440 billion tonnes of carbon dioxide (CO_2) from 2020 onward. If anthropogenic CO_2 emissions continue at current rates, this carbon budget will be depleted in about 10 years (see Figure 1). While the climate change evidence generated by scientists is increasingly more specific and compelling, the governance architecture for achieving the required GHG emission reduction targets remains hotly contested as different countries continue to put their national interests first at the expense of international collective action.

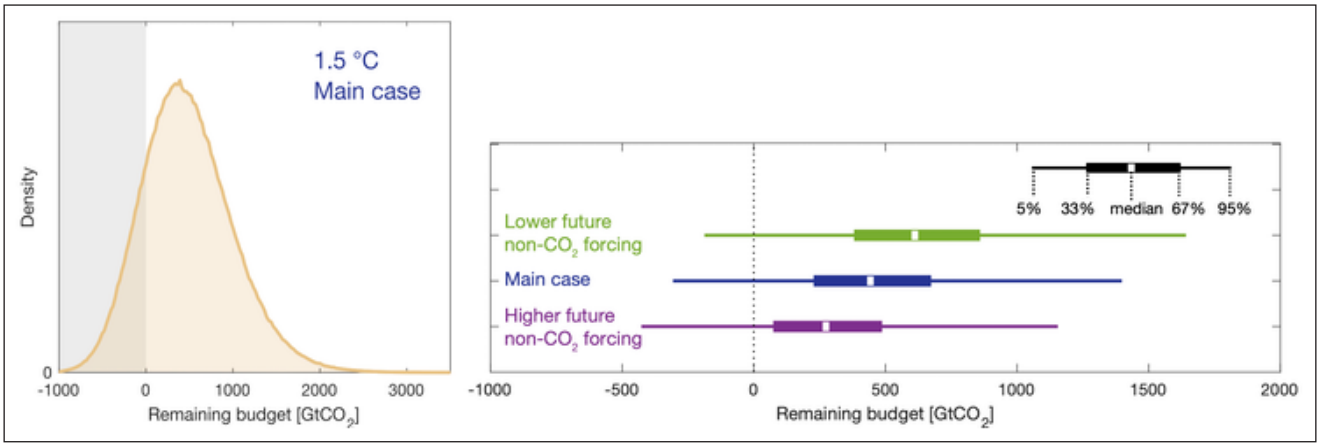

Figure 1 The global carbon balance.

FINANCING FOR THE ATMOSPHERIC COMMONS

Even though it is now commonly agreed that climate change mitigation and adaptation are key ingredients for achieving the sustainable development goals, there is still no consensus on how to reduce national vulnerability without incurring huge costs, particularly through deployment of specific mitigation and adaptation measures (see Kalirajan et al., 2011). According to Carraro et al., (2006), this requires having sufficient knowledge about the magnitude and spatial distribution of potential damages on the one hand, and on the other hand, a more precise estimation of the costs and effectiveness of alternative policy scenarios and programmatic choices, their strategic complementarity and likely trade-offs. A focus on costs inherently engenders the need to think-through financing mechanisms for the required transitions in reducing GHG emissions across the whole world, especially the question of who bears the costs in the global South where financial resources are scarce.

Current estimates paint a gloomy picture of an evidently colossal climate change financing burden that is facing the world. For instance, the IPCC (2018) estimated that through year 2050, the world will require new funding in the range of USD1.6 to 3.8 trillion to transform the global energy supply system; an estimated annual cost of USD180 billion would also be required globally to enable meaningful adaption to unavoidable negative effects of climate change (also see GCA, 2019). The UNFCCC (2007) concluded that a total of US$49 –171 billion per annum would be needed globally for meaningful adaptation to happen by year 2030; about $27 – 66 billion of this amount would need to be reserved for developing countries. These estimates suggest that the issue of financing mechanisms adds more complexity to global level negotiations on frameworks for governing the atmospheric commons. Whilst the deployment of the *common but differentiated responsibilities* approach to climate change financing appears straight forward, it faces challenges at the implementation stage where the primacy of the Westphalian construct of the modern state still rears its ugly head and national political expediency takes precedence at the expense of global collective action.

Developing countries have repeatedly argued that developed countries should carry more of the financing burden because they were able to grow their economies without restraint, emitting more GHGs over time than the developing countries. This argument seems to have carried enough weight and convinced key actors to accept the principle of *common but differentiated responsibilities.* Nevertheless, as Pinsky (2017) points out, it is still very challenging to devise effective international climate change policy because it involves actors with divergent interests, well-entrenched positions that they are unwilling to shift from, different motivations for cooperation, lack of political will in some cases, and displeasure with the high costs that are often associated with adaptation and mitigation interventions. The withdrawal of the USA from the Paris Agreement in 2017, for instance, not only created financing challenges for the Green Climate Fund, but also demonstrated beyond doubt the risk that Westphalianism can bring to the global governance regime for the atmospheric commons (Minas & Bowman, 2017). In addition, the voluntary exclusion of some of the major emitters of GHG such as the USA and China from the Kyoto Protocol demonstrated this risk. Therefore, there is need to explicitly acknowledge the limitations of solely relying on a global climate change governance architecture dominated by the Westphalian model of the nation state when crafting financing mechanisms.

Notwithstanding these challenges, the need for a sustainable climate financing mechanism has still gained currency as the world embarks on the journey towards reduced GHG emissions. Detailed assessments by the OECD

(2019) show that, since 2013, total funding mobilized and disbursed by the developed countries has increased, reaching USD 78.9 billion in 2018. Over the period of 2016–18, for which the total volumes are comparable, climate finance grew by 22% between 2016 and 2017 (from USD 58.6 billion to USD 71.2 billion) and by 11% between 2017 and 2018. While these statistics give the impression that there is overall remarkable progress being made, they also mask the variability of impact across different spatial scales. Some analysts have already indicated that there are significant gaps in the financing of adaptation and mitigation measures in various countries, gaps that the developed countries could cover if they had sufficient political will. For example, Macquarie et al. (2020) point out that even though climate financial flows for the year 2017/18 were 24% higher than that in 2015/16, this was still too low than the amount the world required to comprehensively deal with the impacts of climate change, and indeed certainly way below the volume needed to reach the main objectives and targets set under the Paris Agreement.

Earlier on, Parry et. al. (2009), had made a similar observation when they pointed out that insufficient levels of funding witnessed in several parts of the world have led to a visible gap in adaptation efforts. This evident gap has to be resolved through extra funding for development if all regions are to make significant progress in adaptation and mitigation. As developing countries gain more say in the global climate change governance institutional architecture, they must also expect to assume more responsibility and provide funding for long-term GHG emission reduction whilst climate finance from multilateral and bilateral investors is shifted to building national capacity for designing and implementing more ambitious national climate change policy interventions (Ballesteros et al., 2010). Through the Paris Agreement, many countries have pledged specific emission reduction targets and sums of money for financing climate change mitigation and adaptation. But eventually delivering on those pledges remains the prerogative of the individual nation states; there are no enforcement mechanisms to ensure that they meet them. Thus, it seems fair to assume that the Paris Agreement had inherent weaknesses that arose from the difficulty of getting 195 sovereign states with varying interests to agree to a comprehensive global governance architecture for the atmospheric commons.

POLYCENTRICITY IN INTERNATIONAL RESPONSES TO CLIMATE CHANGE

Over the years, attempts to address the climate change crisis using collective action approaches have turned out to be complex international negotiation processes whose outcomes cannot be easily predicted in advance. Nevertheless, some fundamental pillars to the success of such processes have increasingly become more visible. For instance, Khor (2010) argues that an international agreement to address the climate crisis must simultaneously address three aspects, namely, the environmental imperative to prevent irreversible interference with the climate system; the developmental imperative to enable developing countries to pursue their developmental objectives without increasing GHG emissions; and the imperative of equitably sharing rights and responsibilities towards meeting the environmental and developmental imperatives. As such, a framework for resolving the climate change challenge should be premised on a paradigm for the equitable sharing of atmospheric space and the developmental spaces.[10] Such a framework also lies within the domain of neoliberal paradigms that recognize the primacy of nation state sovereignty as dictated by the fundamental principles of Westphalianism,[11] even though it remains apparent that climate change is a global challenge requiring global solutions that are based on collective action.

Since 1992, the global response to climate change has mainly been constructed within the confines of the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC and other related Conventions represent attempts to create an appropriate institutional architecture and processes for engaging multiple levels of authority to respond to global challenges. The UNFCCC in particular represents the efforts of the parties to garner collective action among the multiple governing bodies from national governments representing sovereign states, to the global level (UN level) to directly respond to the climate change challenge. The lack of progress in reaching consensus on specific lines of action to be implemented by the key players at the global level has led scholars to start searching for alternative approaches that stand a better chance of realizing more tangible results on the ground. The late Elinor Ostrom, for instance, was at the forefront of this shift in thinking. In 2009, she wrote a report on behalf of the World Bank, which advocated seriously considering polycentricity in crafting international climate change agreements, taking into account the multiple scales of governance that could determine the success or failure of GHG regulatory regimes (see Ostrom, 2009; Cole, 2015). While considered to be the best way to achieve collective action, this polycentric approach presents several tensions and contradictions that need to be further articulated.

As an analytical construct in commons scholarship, *polycentricity* is understood as referring to a type of governance that has many institutions that are semi-autonomous and hold substantive power and authority to make decisions (Carlisle & Gruby, 2019). According to

Cole (2015), most scholars on atmospheric commons invariably agree that there is need to consider current and potential climate policies at the national level that could substitute or supplement the existing UN-led climate governance regimes and also catalyze more urgency in global level negotiations. They also view climate change governance as a collection of interrelated institutional structures and ecosystems as opposed to the monocentric legal systems for environmental resource governance that often pervade international discourses (see Victor & Raustiala, 2004; Keohane & Victor; 2011; Abbott, 2012). In addition, it has also become apparent that simply relying on a single governmental unit to solve global commons challenges is likely to be sub-optimal, mainly because of free-rider problems that are often experienced at the local and national levels where resource governance practices actually matter most (Ostrom, 2009). For example, due to inertia caused by uncertainties in the climate change domain and the hesitancy of countries to commit themselves to global agreements, the political process for ratifying the Kyoto Protocol took a whole seven years and only got into force after the ratification by Russia in 2005. Indeed, the substantial delays and disagreements associated with ongoing efforts to achieve an internationally binding framework for resolving climate change challenges require that alternative approaches are pursued (ibid). We view this perspective as suggesting the need to go back to the long-held adage of 'thinking globally but acting locally' to address urgent GHG emission challenges.

It is also important to point out that most scholarship on polycentricity in the governance of the commons recognizes the importance of understanding the interlinkages between human and environmental needs, and the complex interactions in and across ecosystems. This is particularly vital when seeking specific policy and programmatic interventions that can reduce the free-rider conundrum whilst directly contributing to the goals of sustainable development (see Salem et al., 2006; Albareda & Sison, 2020). There are other scholars who emphasize the need to understand the fundamental difference between the 'common good' and 'common goods', arguing that it helps to shed light on some of the complexities faced in managing both local and global commons. For instance, Mele (2009) states that the 'common good' is about what is collectively enjoyed to the extent that it benefits all members of a community, whereas 'common goods' refers to finite resources that are accessed by people in a community and exclusion of anyone from that access is not possible – for example, exclusion from accessing sources of drinking water and forestry products is usually impossible. Consequently, resources such as these are affected by the now well-known Gareth Hardin free-rider problem that could lead to overuse. On the one hand, the atmospheric commons may also be placed in this category of as a common good resources, and the dumping of GHGs into the atmosphere has proved challenging to regulate in part because of the free-rider problem. Collective action at the global level to limit emissions has not yielded the expected results (Schenck, 2008).

A number of advantages that emerge from polycentric governance systems stand out. These include possibilities of enhancing adaptive capacity, design of fit-for-purpose natural resource management institutions, and better-preparedness for risk mitigation (Carlisle and Gruby, 2019). This perspective finds common ground with Cole (2015) who states that there are two major advantages arising from the deployment of polycentricity in resource governance when compared to monocentricity, as defined by Ostrom and her team of researchers. The first is that polycentricity provides room to experiment, learn, and course-correct policies and practices over time. Secondly, they also increase communication and interaction among key stakeholders in a way that builds mutual trust. From the studies by Ostrom and her team, one can deduce that a wealth of evidence already exists which demonstrates the utility of polycentricity in the real world.

From the foregoing, it is also clear that the urgent challenge of mitigating climate change through technical innovations that reduce GHG emissions and limit warming to 1.5 degrees Celsius can only happen when collective action succeeds at multiple levels. According to the IPCC (2021), to have a 66% chance of remaining within the 1.5 degrees warming target would require deep transformations that include changing forestry and agricultural practices, recalibrating industrial systems to conform to new GHG targets, reducing reliance on fossil fuels for electrical power generation, increasing access to clean energy sources, and implementing game-changing technical interventions for carbon capture and sequestration. McKinsey (2020) points out that such a transition is possible if pathways and objectives for reducing GHG emissions are clearly defined in advance, bearing in mind the near-term target of 55% reduction by 2030, and the longer-term target of achieving net-zero emissions by 2050.[12] It is also vital to note that at the current pace of emission reduction, the world is likely to exceed its target of 570-Gt by 2031.[13] Thus, further warming is going to be unavoidable over the next decade and this increases the risks associated with extreme climate-related events such as droughts and floods. Therefore, the crafting of binding international agreements is now more urgent than ever before and this should take into account the opportunities that polycentricity offers.

To achieve the required emissions reductions at the pace and in the time indicated by science, it is necessary that the international climate governance regime embraces actors at transnational and subnational levels within a polycentric

system capable of coordinating the (growing) multiplicity of actors in climate governance. Indeed by decentralizing responsibilities for emissions reductions and other climate actions to the nation state level, the Paris agreement already creates the beginnings of a polycentric governance architecture to regulate the climate response. However, the implementation of the Paris Agreement also demonstrates weaknesses in components of this architecture such as through the inability of actors to mobilise adequate financial resources to support climate actions for developing counties (Chowdhury and Jomo, 2022), the limited involvement of corporations and other non-state actors in climate action (Sullivan and Gouldson, 2017), and even less engagement of sub-national actors (Hultman et al., 2020). The challenges facing polycentric governance of the climate system are discussed in the following section.

NEOLIBERALISM AND THE INTERNATIONAL CLIMATE RESPONSE

Detailed examination of the trajectory of climate responses to-date show that there is a link between the wealth of nations and emissions. Industrialized countries have accumulated wealth directly related to the amount of emissions that they have dumped in the atmosphere. Their ability to continue accumulating wealth is based on their capacity to replace fossil-based fuels with alternative sources of energy. Thus, a key concern of international climate governance regimes is the feasibility of enabling economic growth to increase whilst reducing GHG emissions. In the interim, global climate response initiatives are aimed at limiting or slowing down GHG emissions while enabling the development of more robust adaptation options that reduce the impacts of changes that have already been occurring in the climate system. It follows that if the technical solutions proffered for mitigating GHG emissions are successful, then the need for a functioning atmospheric governance mechanism falls away. In other words, if energy, mobility and spatial planning systems shift to renewable energy, then the earth's climate system stabilises in some state of equilibrium, and the cost of governing the atmosphere would no longer be justified. This in turn will mean that the state once again becomes the most important player, regulating greenhouse gas emissions from within its territorial boundaries.

Governance patterns conform to spatial scales and functions. The nation state in its Westphalian configuration is designed to govern territory over which it has sovereignty. Within nation states, governance processes are determined by national development priorities, politics and policy processes. In democratic systems, governments are time-bound. However, during their subsistence, governments take decisions, make policies and laws; make investments and get into debt – processes which transcend the lives of the governments that make those decisions. Such decisions lead to locked-in processes[14] which also inform the decision making of subsequent governments. Thus, political considerations which inform decision making by governments limit the choices that are available to various governments. As Bosetti & Frankel (2009) state, it is highly unlikely that the governments of tomorrow will necessarily respect and implement commitments made by current governments, especially if those commitments will incur substantial costs.[15]

National governance is also non-linear and fractured in many other ways. Similarly, global governance is complex and reflects the balance of power among sovereign states. The architecture that has been created to facilitate decision making over issues that transcend the boundaries of the nation state does not challenge the enormous structural power differentials and influence between and among sovereign states. This architecture subsists on a conceptual framework that assumes equality of nations within the context of international law. At the same time, the role of the State in promoting and enhancing the specific interests of the ruling economic classes is perhaps nowhere clearer than in the dynamics of climate change governance and policy. Since climate change is the result of society's economic production processes that generate GHGs, it follows that the whole world should focus on drastically reducing emissions to avoid dangerous and irreversible climate change, especially through transforming our economic production systems (see Miliband, 1973; Poulantzas, 1975). In order to have real impact, the necessary transformation must occur rapidly, bearing in mind that the scale and pace of the required transformations will be unprecedented (see IPCC, 2021).

The neo-liberal orthodoxy privileges market based governance of the climate response, and environmental and social concerns are subordinated to the logic of capital accumulation (Evans and Musvipwa, 2017). The Paris Agreement, while putting in place mechanisms for states to regulate emissions through their Nationally Determined Contributions (NDCs), also creates, through its Article 6,[16] provisions for carbon trading as the principal mechanism for markets to regulate how much carbon is emitted, sequestered and off-set. Article 6 of the Paris Agreement recognizes that some Parties choose to pursue voluntary cooperation in the implementation of their nationally determined contributions to allow for higher ambition in their mitigation and adaptation actions and to promote sustainable development and environmental integrity (UNFCCC 2015). Carbon trading as a means of reducing greenhouse gas emissions was introduced into the UNFCC through the Kyoto Protocol's Clean Development Mechanism (CDM). These market-led strategies reveal the

neo-colonial dimensions of the United Nations' climate-change framework. The CDM and the carbon market have been described as key vehicles in the expansion of capitalism by reinforcing the commodification of nature and facilitating the creation of new financial markets and thus securing the conditions for accumulation and capital reproduction while allowing polluters to avoid paying the real costs associated with structural change (Cabello, 2009). The CDM was thus seen as a mechanism to subsidise big polluters.

However, the foregoing presents several challenges for different countries, and in particular how to maintain their role of regulating development while at the same time addressing climate challenge. In this paper, we argue that the way in which these choices have so far been made reveals the dominance of neo-liberal interests in global climate governance, and demonstrates the tensions between the nation state and global interests. It also exposes the North-South divide, with developing countries facing different choices and calculations. Pursuing climate change mitigation entails abandoning existing fossil fuel-based technologies and adopting rapidly developing renewable energy technologies which are still unproven at the scale required to drive the developmental ambitions of the South. As Edenhofer et al. (2013) point out, developing countries have to make a very difficult decision, that is, either continue emitting GHGs into the atmosphere or significantly reduce GHG emissions at the expense of national economic production and growth.

CONCLUSION

We set out to gauge the performance of the Kyoto Protocol and the Paris Agreement of 2015 in regulating national and global GHG emissions. Our assessment established that the Westphalian model of the nation state gives various countries the power to refuse to ratify international frameworks designed to govern the atmospheric commons using collective action. In many cases, enforcing commitments and pledges made by various nation states at the international level is very difficult, mainly because the pursuit of national economic growth is accorded precedence over the imperative for reducing GHG emissions. This inevitably weakens the global governance regime for the atmospheric commons. While the principle of common but differentiated responsibilities gives some comfort to developing countries in terms of financing climate change, their desire for accelerated economic growth runs counter to the commonly accepted priorities for reducing GHG emissions.

Enforcement mechanisms are needed that will enable nation states to be held accountable for the climate change finance and emission reduction pledges they make. In addition, it is vital for all countries to negotiate in good faith and exhibit sufficient political will for implementation when international agreements are crafted, taking into account the wealth of knowledge on climate change that scientists generate as well as the inherent power, responsibility, and accountability obligations that pervade the landscape of governing atmospheric commons. In this landscape, the most meaningful interventions for reducing GHG emissions appear to have mostly been happening outside the confines of the Paris Agreement, with key actors at the national and local levels taking transformative actions, and thereby reconfirming the utility of polycentricity. If successfully pursued and implemented, specific commitments made by various countries through the nationally determined contributions for GHG emission reduction are a reflection of proposed actions at the national level. Mid-century net-zero emission targets and national long-term strategies for reaching those targets also constitute solid plans that are already being implemented in some countries to achieve climate change mitigation and adaptation without necessarily waiting for an international governance regime that is established by consensus.

NOTES

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COMPETING INTERESTS

The authors have no competing interests to declare.

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