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Progress in Development Studies 25, 3–4 (2025) pp. 255–274

Climate Injustices have Multiplied over Time: The Need for Climate System Justice

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Abstract: This article asks: How have climate injustices accumulated in climate negotiations, and how can a climate system justice approach be developed? It concludes that, first, without a just approach, climate change cannot be addressed. Second, it identifies six cumulative injustices: (a) delay of the long-term climate objective, (b) post-equitable sharing of the 'carbon budget', (c) ignoring stranded resources and assets, (d) adopting efficient but inequitable/ineffective mitigation instruments, (e) weak adaptation and loss and damage strategies and (f) a symptomatic not curative approach. This article concludes by calling for climate system justice, arguing that only a just approach enables effective climate policy.

Key words: Climate justice, Earth system justice, Mitigation, Adaptation, Fossil fuels

I. Introduction

Sharing the Climate Ecospace

Climate justice interrogates how relevant resources and sinks or climate ecospace (environmental utilization space) and the related costs and burdens are shared among people, communities and countries (Fisher 2015), among past, current and future generations, and between humans and the rest of the natural world (Gupta, Chen, et al., 2024). It assesses who causes the problem and who is affected (Newell, 2022: 916).

The climate justice scholarship covers local injustices (e.g. in IPCC reports) through injustices in global climate institutions (e.g., Okereke and Coventry, 2016) to the intersection of climate injustice with violations of Indigenous or gender rights (e.g., Sultana 2021; Whyte 2020). This article asks: How have climate injustices manifested and accumulated in the global response to climate change, and how can a deeper understanding of these injustices inform approaches to managing the problem of climate change, including climate system justice (CSJ)? It draws on climate justice scholarship (see the 'Climate Justice Scholarship' section) and the history of climate change negotiations (e.g., Gupta, 2014), and applies the earth system justice (ESJ) framework (Gupta, Liverman, et al., 2023; Gupta, Prodani, et al., 2023; see Section II) to identify six layers of

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10.1177/14649934251360854

progressive escalation of climate injustices in the climate regime (see Section III). It develops a CSJ approach, draws lessons for future climate action (see Section IV) and presents conclusions (see Section V).

II. Climate Justice Scholarship and the ESJ Framework

Climate Justice Scholarship

The scope of climate justice scholarship is broad, diverse and fragmented. Some include gender (Terry, 2009), intersectional (Mohai et al., 2009; Sultana, 2021) and Indigenous perspectives (Whyte, 2020); human rights and equitable pathways (Reese, 2016; Robinson and Shine, 2018). Others discuss interspecies, multispecies and more-than-human justice to protect other species and ecosystems (e.g., Celermajer et al., 2021). Still others intersect climate justice with energy (Sovacool et al., 2017), environmental (McCauley and Heffron, 2018; Schlosberg, 2013) and water justice (Gupta, Bosch and van Vliet, 2025); land use, urban and adaptation justice (Anguelovski et al., 2016) and environmental justice movements (Martínez-Alier et al., 2016) protesting polycentric injustices (Tormos-Aponte and García-López, 2018). Justice dimensions include (re-)distributional, recognition, procedural and participatory justice, intra- and intergenerational justice (Eizenberg and Jabareen, 2017; Fisher, 2015).

Climate justice research often focuses on instruments to address climate change including market mechanisms (Bolin and Tassa, 2012; Godden and Tehan, 2016; Goodman and Boyd, 2011; Orellana, 2010; Xu and Zhang, 2022) and net zero goals (Khosla et al., 2023). Such instruments may inequitably distribute resources and environmental burdens (Schlosberg and Carruthers, 2010). The Earth System Governance community's access and allocation framework helps frame substantive (distributive, restorative and corrective) justice in terms of equitable ecospace sharing (Gupta and Lebel, 2010, 2020): who has access to basic resources (human needs/rights), and how the remaining resources, risks and responsibilities are shared.

Such proposals must be embedded in procedural justice. Principle 10 of the Rio Declaration on Environment and Development (UNCED, 1992) calls for access to information, decision-making and courts. Treating unlike people alike is not enough; affirmative action may enable the most marginalized to participate (Andresen and Boasson, 2012; Okereke, 2010), and all affected (e.g., Indigenous peoples and youth) need to be invited to the climate negotiations (Gustafsson and Schilling-Vacaflor, 2022). While some scholars argue that procedural justice trumps substantive justice, others favour calibration between them to enhance justice. For example, if land taxes are evenly implemented, poor landowners may be forced into distress sales, impoverishing them further (Olofsson, 2021), requiring substantive justice rules to be corrected.

Finally, underlying power structures and sectional inequalities reproduce injustices (Newell et al., 2021), marginalization, vulnerability and inequality (Gupta et al., 2015). These can be addressed through, for example, the capabilities approach (Alves and Mariano, 2018; Schlosberg, 2012), questioning the structure of the global economy, including commodification and green capitalism (Chatterton et al., 2012; Dawson, 2010), addressing ecological debt and unequal exchange (Roberts and Parks, 2009) and drastic North–South, rich–poor inequalities perpetuated by growth paradigms (Ogunbode, 2022; Sultana, 2023). Environmental science assessments (e.g., IPCC, Global Environmental Outlook) also refer to environmental injustice and provide hints about just approaches needed (UNEP, 2021; Gupta, Prodani, et al., 2023).

Earth System Justice

Based on the above and several workshops, the Earth Commission proposed ESJ (Gupta, Liverman, et al., 2023), briefly explained here and applied in Section III. ESJ starts with ideal, recognition, epistemic and data

justice. It promotes ideal/transformative justice over conservative/incremental justice (Kalfagianni and Meisch, 2020), arguing that the latter reproduces injustices. It uses recognition justice to prioritize the perspectives of marginalized people. Epistemic justice implies including different disciplines, non-Western and Indigenous epistemologies, ontologies and knowledges: For example, Agarwal and Narain (1991) showed that the climate regime reinforced colonialist structures and sharpened the North–South divide. ESJ uses the 3 Is of justice (Gupta, Liverman, et al., 2023): Interspecies justice and earth system stability (ensuring that the biogeochemical systems that support life on Earth are resilient) (I1); Intergenerational justice (I2) (relations between past generations and current ones, and between current and future generations (Page, 1999; Schuppert, 2011); and Intragenerational justice (I3) (relations between individuals, communities and countries examined through an intersectional lens) to identify just boundaries (Rockström et al., 2023). ESJ includes procedural and substantive justice. It is operationalized in terms of ends (boundaries; foundations—the ecospace needed to meet basic needs/human rights) and means (drivers, allocation of risk, remaining resources and responsibilities). While this approach has limits, ESJ provides a systemic lens for examining climate injustices (see Section III) before enabling an elaboration of CSJ (see Section IV).

III. Climate Injustice Multiplies Through Cumulative (In)Actions

Scholarship reveals six cumulative injustices in the climate change regime, elaborated below and connected with the ESJ framework (see Figure 1).

Delay in Adopting a Temperature Objective: Recognition, Epistemic and Procedural Injustice

The first injustice, which exacerbates the other injustices, is the 23-year delay in adopting a global temperature objective/boundary in 2015.



Figure 1. Cumulative climate injustices that exacerbate each other.

This arises from three interconnected problems: First, the no-harm limited sovereignty principle (i.e., you can do what you like within your country as long as you do not cause harm to others) was not adopted in the Climate Convention, although it is part of customary international law (*Trail Smelter Arbitration (United States v. Canada)*, 1950). Article 2 instead focused on limiting dangerous anthropogenic interference with the climate system (Gupta, Chen, et al., 2024; UN, 1992). Second, this delay in adopting the mitigation objective shaped the scientific agenda, delaying investigation into the risks associated with failing to limit emissions. We know since the 1970s that global average warming beyond 2°C could result in non-linear, irreversible changes (Nordhaus, 1975) and that below 1°C, damage to humans would be limited (Rijsberman and Swart, 1990; Vellinga and Gleick, 1990: viii). However, since the 1°C boundary was framed as 'unrealistic' (Randalls, 2010) by predominantly Northern scholars, the economically and politically more acceptable 2°C boundary was more frequently discussed, even though some found this number also prohibitively expensive (Barrett, 1992; Franta, 2022; Montgomery, 1992). Little research was produced on climate impacts below 2°C until 2016, when the IPCC was requested to produce a special report on 1.5°C. Comparing IPCC reports reveals that recent reports demonstrate evidence that damage is greater at lower temperatures than that predicted in early reports (Gupta, Chen, et al., 2024). Even at 1°C, 70 million people are exposed to death or health problems from very high wet bulb temperatures, citing just one impact indicator; hence, 1°C has been proposed as a just objective integrating interspecies, intergenerational and intragenerational equity (Rockström et al., 2023). Thus, the climate science agenda failed to incorporate: recognition justice by prioritizing vulnerable people and countries and epistemic justice in terms of including other data and knowledges. Thus, science may have protected some short-term economic interests at the cost of others (data injustice), also exacerbating procedural injustice.

Third, this delay makes target achievement impossible. The negotiations took 23 years for the 2°C objective (and if possible, as low as 1.5°C above pre-industrial levels) to be adopted, and another 8 years before 1.5°C was prioritized at COP28 in 2023. To have a 50% chance of achieving 1.5°C requires reducing greenhouse gas (GHG) emissions to net zero by 2050 (IPCC, 2018); however, 1°C and perhaps even 1.5°C are now out of reach (Lamboll et al., 2023). Moreover, the later we peak our emissions globally, the more rapidly we have to reduce emissions, which itself brings new justice issues.

Delay in Sharing the Carbon Budget: Distributive Injustice

The above-mentioned delay has postponed the process of translating the objective into a carbon budget for sharing between countries and actors. The remaining carbon budget (as of January 2023, at a 50% chance level) is approximately 1,200 $GtCO_2$ for 2°C and only 250 $GtCO_2$ for 1.5°C (Lamboll et al., 2023). Although the Climate Convention adopted the principle of common but differentiated responsibilities and respective capabilities, requiring rich countries to reduce their emissions to make space for developing countries, the USA and Canada did not ratify and withdrew from the Kyoto Protocol, respectively, and did not participate in the Doha Amendment, reflecting their unwillingness to comply by reducing their emissions.[1] The 2015 Paris Agreement enables countries to voluntarily adopt targets, and hence, the pretence towards distributive justice in climate targets has ended, allowing implicit grandfathering (i.e., those with higher levels of previous emissions claim higher future emission rights). Such voluntary targets add up to a 2.7°C world (Climate Action Tracker, 2023), encourage flagrant disregard of the long-term objective and justice considerations and cannot be subject

to accountability or coordination measures. As the available carbon budget shrinks every year, the conflict between rich and poor countries and people increases, and climate injustices are exacerbated.

Despite proposals for equitable carbon budget sharing (Holz et al., 2018; Kolers, 2012), such a distribution did not materialize, denying developing countries their right to development. This right was adopted in 1986 (UNGA, 1986) but contested as to whether it is a right of humans (as argued by Western countries) or states (as argued by poorer countries) (Adam, 2006; Garcia-Amador, 1990; Kirchmeier, 2006; M'Baye, 1972; Piron, 2002; Udombana, 2000). Poorer countries have argued that they need a fair governance system to develop and that if rich countries monopolize the ecospace and promote unfair governance, their right to development is compromised (Gupta and Arts, 2018). However, the Climate Convention includes this as the 'right to promote sustainable development' in the Climate Convention through a strategic shift of a comma, and the Paris Agreement included this in the preamble, reducing its legal significance (Biniaz, 2016; Bodansky et al., 2017; Gupta and Arts, 2018). While contraction and convergence discussions (Global Commons Institute (GCI), 1996) implied that rich countries would have to contract their emissions and allow developing countries to increase their emissions to reach a convergence point, today, the net-zero narratives force all countries to converge to zero. The late arrival at zero for rich countries leaves little space for poor countries to delay reaching net zero if 1.5°C–2°C is still to be achieved.

Ignoring Stranded Assets and Resources: Allocation Injustice

Meeting the above objective implies leaving most remaining fossil fuels underground (Trout et al., 2022; Welsby et al., 2021). However, 78% of these fuels are in the territory of developing countries (Gupta, Chen and Rammelt, 2024), implying that the burden of stranding these resources falls on them. Thus, delays in adopting and dividing the carbon budget compound the current and future injustices experienced by developing countries.

The principle of full permanent sovereignty, used by developing countries during the post-colonial era to gain control over their resources, is restated in the 2030 Agenda to ensure that they can use their own natural resources (UN, 2015). Given that rich countries excluded the no-harm, limited sovereignty principle in the Convention, they cannot now invoke this principle to prevent developing countries from exploiting their fossil fuel and forests. Not only have richer countries historically failed to accept limits to their right to exploit resources, but they have also proven unwilling to materially support developing country initiatives to limit extraction (e.g., Ecuador's 2007 (failed) Yasuní-ITT initiative; Le Billon and Kristoffersen, 2020).

Worse, many Western actors continue to invest in new fossil fuel projects in the global South (Dordi et al., 2022; Gupta et al., 2020; Manych et al., 2021). Since these investments have long lifetimes, closing them prematurely implies stranded assets in the global South (see Figure 2) and may exacerbate their debt to rich country investors.

Mitigating Emissions: Market Mechanisms Efficient but Ineffective (Allocative Injustice)

Although the Kyoto Protocol included emission targets for Annex B countries for 2008–2012, the key instruments adopted for sharing responsibility for mitigation were market mechanisms like Joint Implementation, the Clean Development Mechanism (CDM), emissions trading and at a later Conference of the Parties—Reducing Emissions from Deforestation and at a later Conference of the Parties – Forest Degradation (REDD+) initiatives (Gupta, 2010). However, these instruments raise various issues: first, for these instruments to function properly, they need to apply to major emitters. The

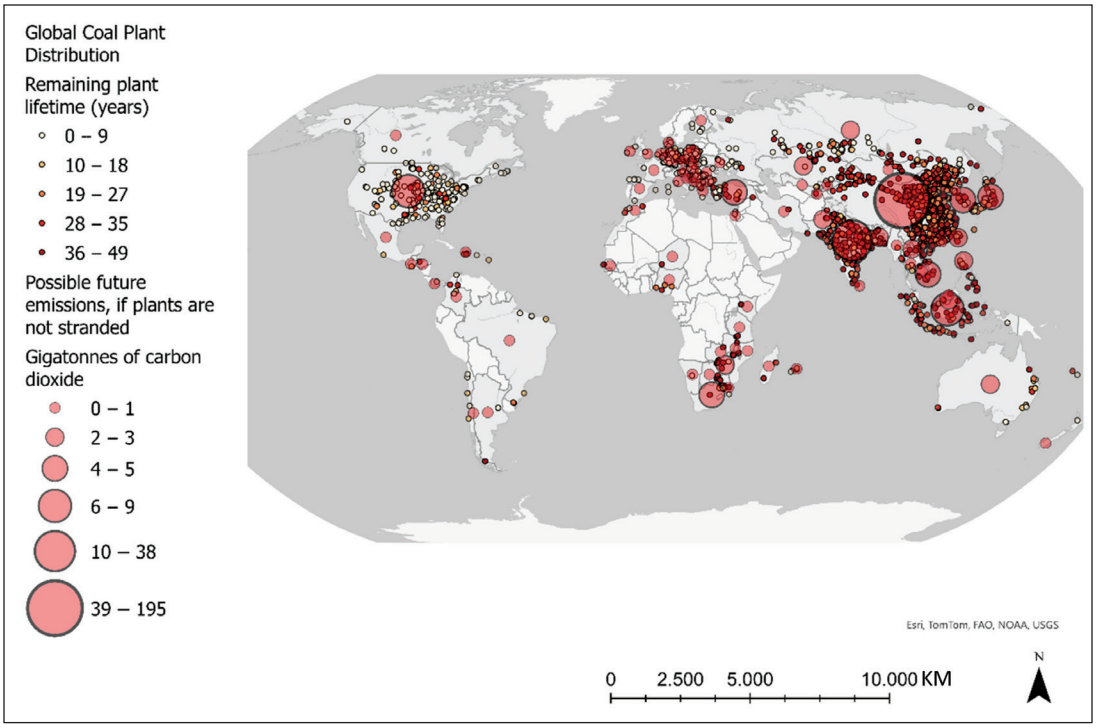

Figure 2. The distribution and remaining lifetime of operating and planned coal-fired power plants and their estimated future emissions, which may have to be stranded to achieve 1.5°C.

Source: This map is from the CLIFF Interactive Atlas produced by the authors, using data from GEM's Global Coal Plant Tracker, July 2023.

absence of the USA and Canada reduced the demand for carbon credits, lowering the price of these credits and hence the impact on global emissions (Buchner et al., 2002; Pickering et al., 2018). Second, while market mechanisms are efficient and politically feasible as they allow offsets, their effectiveness in transforming societies in home countries is limited (Lohmann, 2012; Rempel and Gupta, 2022). Market mechanisms face leakage problems. Additionally, the incentives were insufficiently stringent to persuade companies or countries to fundamentally change their businesses: companies have utilized emissions trading while continuing to reinvest profits into expanding their emissions-intensive activities and, indeed, continuing to subsidize their fossil-based energy systems. For example, despite participating in the EU Emissions Trading Scheme, the Netherlands continued to invest in fossil-based power generation (Chappin and Dijkema, 2009; Venmans, 2012). Further, despite calls to phase out 'inefficient' fossil fuel subsidies, the Netherlands directly and indirectly subsidizes fossil fuel use through, for example, tax exemptions or the free provision of ETS allowances to certain industries (Brink et al., 2023; G20, 2009). While these subsidies were initially estimated at €4.5 billion, NGO and later government investigations revised estimates to €39.7–46.4 billion annually (NOS, 2023; SOMO et al., 2023). This may indicate that the IMF's estimate that fossil fuel subsidies amount to $7 trillion globally (Black et al., 2023) is a significant understatement. This undermines potential impacts of other

market interventions. Ultimately, such mechanisms postpone the need for structural change, postponing significant costs to the future when swift reductions become urgently needed. Moreover, at the NATO conference in 2025, members have agreed to substantially increase their military spending, which will also increase GHG emissions in rich countries.

Such injustices are not just between North–South but also between rich and poor people. For example, in many Western countries, subsidies were given for renewable energy, e-vehicles and heat exchange to rich people. However, there was no real effort to subsize the energy transition for poorer people, who often face the challenge of eligibility criteria, access to information, the landlord–tenant problem—where the landlord has no incentive to invest if the tenant reaps benefits—and gentrification and increasing costs of public transportation.

Adaptation, Loss and Damage, and Finance: Allocation of Risk/Harm and Related Injustice

Three issues affect adaptation justice. First, the watering down of legal principles: while 'compensation' was discussed in the 1980s, the Climate Convention framed it as financial assistance that was 'new and additional' (Article 4.3) to the pledged 0.7% of GDP for development cooperation (UN, 1992). The narrative, enshrined in the CBDR-RC principle, suggested that rich countries would reduce their emissions and provide financial assistance and technology to the South (Gupta, 2010). The change in narrative, coupled with excluding the no-harm principle, helped avoid liability for harm caused to others. Moreover, 'new and additional' was later framed as new and additional to *existing* development assistance, which was much less than 0.7% (OECD, 2024). Over time, the focus shifted to reducing emissions and assisting the South via market mechanisms, and then to mainstreaming climate financial assistance in overall development cooperation (Gupta and van der Grijp, 2010), and now there is talk of loans and blended finance.

Second, the focus on mitigation over adaptation: The Global Environment Facility, which served as the interim financial mechanism, initially offered funding only for activities that led to global benefits (i.e., mitigation), and since then, resources have been mostly for mitigation. Resources for adaptation have been scarce and delayed. It was not until 2007 that the Adaptation Fund was officially launched, financed by a levy on the CDM, but with limited resources (Remling and Persson, 2015; Trujillo and Nakhooda, 2013). The establishment of the Green Climate Fund in 2010 resulted in more loans than grants (Kalinowski, 2024). The Adaptation Gap report (UNEP, 2024) says adaptation funding increased from $22 billion in 2021 to $28 billion in 2022; most likely, it has decreased since then with the decline in development cooperation money. The adaptation finance gap is at $187–359 billion annually.

Third, compensation for residual damage caused is returning to the agenda with rising global damage (Appadoo, 2021). At COP26, a two-year Glasgow Dialogue was established to discuss loss and damage funding, including support for the Santiago Network on Loss and Damage, which would assist developing countries with their claims. The Dialogue allowed developing countries to present their claims, while rich countries responded vaguely, turning it into a 'talk shop' (Bhandari et al., 2024). At COP28, parties agreed to operationalize a loss and damage fund: initial pledges totalled $700 million (Lakhani, 2023), and the secretariat is to be hosted at the UN Office for Disaster Risk Reduction and the UN Office for Project Services. However, the 2023 stocktake reveals that there is no legal obligation, and little money has actually been disbursed. Funds for loss and damage may come at the expense of adaptation (Rowling and Graham, 2023), energy transition or even development assistance. However, estimates of climate change-attributable damage between 2000 and 2019 reveal annual costs of $143 billion, with 63% of this due to loss of life (Newman and

Noy, 2023). Residual damages in developing countries may increase from $116–435 billion in 2020 to $290–580 billion in 2030 and to $1–1.8 trillion by 2050 (Markandya and González-Eguino, 2019). Despite these projections, only Canada, Germany and New Zealand have shown support for such finance, while Denmark, Scotland and the Belgian region of Wallonia have made pledges (Bhandari et al., 2024; Lo, 2022).

More generally, providing financial resources to developing countries has been limited since the 1990s. The 2015 COP Agreement promised developing countries $100 billion annually from 2020 onwards, but it was not clear who would pay what, and only $83.3 billion was mobilized by developed countries in 2020 (OECD, 2022). At COP 29, $300 billion annually was promised by 2035 for developing countries within a broader commitment of $1.3 trillion for climate change. However, adaptation funding comes largely from multilateral and bilateral assistance, with minimal contributions from the private sector and export credit agencies (Climate Policy Initiative, 2023). In the context of declining aid funds and greater militarization, Annex B countries are not genuinely committed to financing mitigation, adaptation and loss and damage in the developing world. Furthermore, funding remains project-based rather than programmatic, hindering real transformation (Serdeczny et al., 2021). Frequent project rejections further delay action; moreover, distinguishing between humanitarian funding and climate finance becomes challenging (Pandit Chhetri et al., 2021).

A Symptomatic, Not Curative, Approach: Avoiding the Drivers of Climate Change and Vulnerability

Since 1990, not only has there been increasing discussion of growing environmental challenges worldwide, but neoliberal capitalist logic and frameworks have increasingly shaped development and climate action (Gabor, 2021; Lohmann, 2012). This has occurred without sufficient attention to the role of neoliberal economic growth in causing climate change and biodiversity loss (Buller, 2022; Sultana, 2023). Powerful negotiators ensure that the UNFCCC takes a symptomatic approach, advocating for energy efficiency and agricultural reform, without addressing the drivers of extraction, investment, production, distribution and consumption—all embedded in the linear GDP growth narrative. We believe that sustainable development, which aims to balance economic, social and ecological dimensions, will not help address climate change. If the fossil fuel market is worth between $16 and $295 trillion (Linquiti and Cogswell, 2016), while the social and ecological damage is considered only in terms of theoretical and fictional costs of inaction, strong sustainability will always favour the short-term economy. Sustainable development requires meeting the needs of present generations without compromising the ability of future generations to meet their own needs. However, both intra- and intergenerational equity is scarcely on the agenda. Green growth, increasingly recommended, is no panacea: growth itself, driven by profit maximization, externalizes social and ecological impacts. Inclusive development could be a solution but only when we understand that inclusiveness is not an adjective but must redefine the content of development (Rammelt and Gupta 2021).

IV. Towards Climate System Justice

Section III has argued that six overlapping injustices in the climate arena have created a runaway climate problem. By not addressing the key driver of climate change—neoliberal economic growth—capitalism has promoted the illusion of El Dorado, promising growing wealth for all, but has not accounted for the limited ecospace. While short-termist politicians and CEOs reap the benefits of this growing wealth, they have neglected the impacts on countries, societies, people and ecosystems. To have any hope of stabilizing

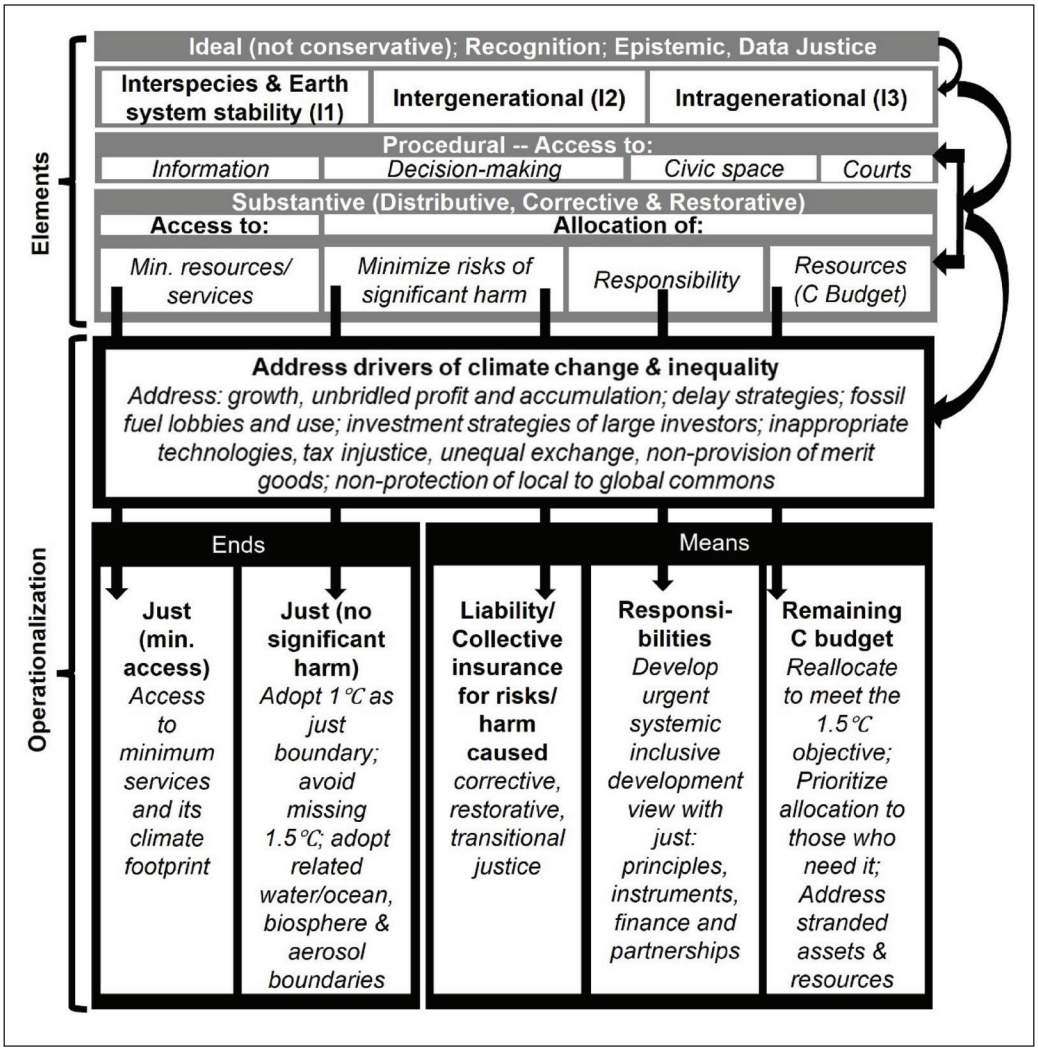

Figure 3. Climate System Justice.

Source: Own figure, adapted from Earth System Justice (Gupta, Liverman, et al., 2023).

climate change, we need to create a systemic approach to climate justice (see Figure 3).

The Need for Integrating Elements of Justice

CSJ (see Figure 3) integrates different justice elements, including ideal, recognition and epistemic justice, and how this intersects with intersectional injustices; these have been substantially ignored by the IPCC and negotiation outcomes. CSJ integrates the 3I's of justice: We argue that the treatment of the long-term objective in the climate regime has failed to account for interspecies, intergenerational and intragenerational justice, ignoring the wider impacts on biodiversity, food, water and health. CSJ requires procedural justice, but we argue that the regime has failed to generate balanced information

creation and access to information, delayed access to decision-making for many actors, civic space is increasingly shrinking across the world, and while courts are creating space for climate-related demands, they are also giving contradictory judgments. CSJ calls for addressing the drivers of the climate emergency and of poverty/inequality and the fair allocation of the remaining resources, risks and responsibilities (which are scarcely addressed in the climate regime). The climate regime's excessive focus on market mechanisms for allocating the carbon budget between countries has compromised the substantive elements of justice. The market-based, deregulated, voluntary global system prioritizes conservative, grandfathered, thin justice, as opposed to ideal justice (Okereke, 2010). Without a constant iteration of local to global justice concerns within a transformative perspective, we cannot manage global climate change and related biodiversity and water problems. This justifies our CSJ approach, which implies all elements have to be adopted in relation to each other rather than selecting a single element. Moreover, this provides the principles for addressing the polycentric justice crises.

Zooming into procedural justice, the perspective of the most marginalized must be accounted for in science, information and decision-making. Ignoring these perspectives has led to a delay in the long-term objective and increasing protests and court cases. Embarrassed governments are coming down hard on the protestors, and courts are being politicized. However, climate impacts are worsening, and states may have to respond to legitimate demands. Some courts have become bolder, as seen in cases against the Dutch state (*Urgenda Foundation v. State of the Netherlands*), Shell (*Milieudefensie et al. v. Royal Dutch Shell Plc.*) and the Swiss state (*Klima Seniorinnen v Switzerland (ECtHR)*, demanding ambitious action. Climate court cases have grown rapidly, with 2,182 cases identified as of 2022 (UNEP, 2023). The International Tribunal on the Law of the Sea has identified GHGs as pollutants affecting the sea, and states are obliged to reduce their pollution in accordance with common and differentiated responsibilities and to do so with due diligence. Failure to reduce emissions can thus lead to action under this advisory opinion (ITLOS, 2024). However, there is also an increase in strategic litigation against public participation (SLAPP) cases, where companies are pre-emptively suing NGOs and others: In 2025, a jury in North Dakota required Greenpeace to pay $660 million in damages to Energy Transfer (the company involved in the Dakota Access Pipeline). Such cases try to reduce the civic space of non-state actors. Substantive justice requires a programmatic (i.e., a comprehensive programme to reduce emissions), systemic and principled approach within which projects and instruments are encouraged as explained below.

Ends

A CSJ approach targets two ends. The first is to adopt safe and just boundaries: 1°C is the proposed just boundary; since we have passed it, we must not cross 1.5°C to avoid the worst tipping points and a completely unpredictable climatic future (Rockström et al., 2023). This will also limit damage to biodiversity and water and needs to be achieved in conjunction with the safe and just biodiversity, water and aerosol boundaries.

The second is meeting the minimum needs of all as required by human rights agreements and the 2030 Agenda and the SDGs (UN, 2015). The Earth Commission shows that meeting such minimum needs (e.g., to food, water, energy, housing and transport) has pressure on the climate system and that reducing GHG emissions consistent with a 1–1.5°C world must also make space for meeting the basic needs of people (Gupta, Bai, et al., 2024). This leaves a small carbon budget left over for use by others. This implies that it is essential to reduce the pressures of the rich to accommodate the needs of the poorest through

radical resource redistribution (Rammelt et al., 2022). Hence, fulfilling these needs now and into the future cannot be done through the existing energy mix (as many governments argue) but must be met through non-fossil fuel sources to avoid further entrenching societies in a fossil fuel economy (Gupta, Bai, et al., 2024). This requires financing the energy transition globally to enable meeting minimum needs with non-fossil energy.

Means

Four means are proposed to achieve CSJ: the need to address the underlying drivers of climate change and poverty, the need to allocate responsibility for both harm and the remaining carbon budget and revisit the allocation mechanisms.

First, an ideal approach requires addressing drivers of climate change and drivers of poverty/inequality, implying a shift from a symptomatic to a curative approach. Such drivers include the push towards maximizing GDP, profits and accumulation (the delay strategies of vested interests); the role of fossil fuel lobbies, advertising and use; the investment strategies of large investors; the deployment of technologies that enhance resource extraction, use and pollution; and unabated consumption patterns (Gupta, Bai, et al., 2024; UNEP, 2019) and the underlying power dynamics. Addressing these drivers involves (a) identifying inclusive development paradigms and pathways that prioritize maximizing human well-being and natural system flourishing, and how the power of polluters is constrained; (b) recognizing an adequate social cost of carbon and (c) adopting the precautionary principle in relation to finance and technologies.

Drivers of inequality include ecological debt and unequal ecological exchange, tax injustice, the non-provision of merit goods (such as water, energy, health care and education) and the non-protection of public goods. Addressing this requires promoting, among other things, correcting for this ecological debt, tax justice and ensuring the provision of merit and public goods (Kaul et al., 1999) and protecting the commons (Rockström et al., 2024). Together, these instruments go beyond incremental changes (Rajagopal, 2013) to promote structural changes and may help counter entrenched power.

Second, climate change has caused significant damage worldwide, manifesting as extreme heat, extreme weather events, including drought and floods, and changing precipitation patterns. This has led to irreversible damage to humans, other species and ecosystems (see damage costs in the 'Adaptation, Loss and Damage, and Finance: Allocation of Risk/Harm and Related Injustice' section). To address this, it is essential to re-recognize the principle of limiting territorial sovereignty and not causing significant harm to others with retrospective effect in the climate regime, reduce emissions and compensate for the harm caused to others to ensure restorative justice. Serious consideration must be given to proposals requiring fossil fuel companies, major polluters, and the ultra-wealthy to contribute financially to climate action (Blom and Walsh, 2023; Grasso and Heede, 2023; Mundy, 2024).

Third, the carbon budget for limiting warming to 1°C has been used up some time ago, and the carbon budget for 1.5°C allows for less than 5–6 years of emissions (Lamboll et al., 2023). How will the remaining budget be allocated? The Paris Agreement allows voluntary commitments, which is not commensurate with achieving 1.5°C. We identify five potential arguments that developing countries may use on fossil fuel: (a) using all fossil fuels available within their territory and those needed for existing fossil fuel infrastructure and machinery under the full permanent sovereignty over natural resources rule; (b) using their 'fair share' of fossil fuels; (c) using the atmospheric space needed for their sustainable development; (d) using fossil fuel commensurate to meet society's basic needs and (e) 'leapfrogging' ahead and avoiding fossil

fuels: for example, Chinese emissions have peaked (Myllyvirta, 2024) and it can leapfrog ahead. Many scholars argue that developing countries may choose to use their fair share, a share that rich countries did not leave for them (Rajamani et al., 2021). Developed countries—governments and citizens—need to ask themselves if they want to continue facing the consequences of climate change. If the answer is negative, then they must actively engage in persuading developing countries not to take even a 'fair' pathway that will be disastrous for all. This requires developed country governments and actors to finance the just energy transformation in the global South, while reducing their own emissions rapidly. The top 10% worldwide have the resources to help governments worldwide address this problem. They need to take responsibility; ensuring the remaining carbon budget is allocated to those who need it most is the most just way forward (Dubash 2023). Third, addressing climate change requires revisiting the allocation of responsibility. This implies just principles, just instruments, just finance and technologies, and just partnerships:

Just principles: Just principles include recognizing the no significant harm principle and the right not to be exposed to a changing climate in setting boundaries (see the 'Delay in Sharing the Carbon Budget: Distributive Injustice' section), the human rights principle in setting (e.g., energy) access foundations (see the 'Ends' section) and the common but differentiated responsibility and respective capability principle. Fair allocation of the remaining carbon budget based on the principle of the right to inclusive development, need and sufficiency (see the 'Ends' section), accounting for intersectional inequalities, should also be adopted. In practice, this will also require promoting a supply-side transition away from fossil fuels, demand-side management targeting those who overuse energy, and managing land use and agriculture to minimize land-use change, among other strategies.

Just instruments: Within a programmatic approach, different types of projects and instruments are required to concurrently achieve multiple objectives. Concentrating on efficient market-based instruments at the cost of equitable and effective instruments will not address the problem (Rempel and Gupta, 2022). We need a wise combination of regulatory instruments (targets, standards, environmental impact assessments, etc.), suasive (information and public education, labelling, certification), financial (tax justice, incorporating the social cost of carbon) and economic mechanisms to achieve the end goals.

Just finance: The energy transition, as well as adaptation, loss and damage, will need to be financed. Just finance needs to separate (a) compensation, (b) development cooperation and (c) investment projects. Compensation projects within a programmatic approach need to finance loss and damage and adaptive capacity projects. Development cooperation projects need to focus on non-bankable projects, such as reskilling labour and addressing stranded asset risks, to ensure a smooth energy transition. Investment projects should preferably be in local currency, at low interest rates, with patient capital for larger non-fossil infrastructure projects. Community projects can help ensure that communities can transition in both rich and poor countries. Governments and development banks may need to offer guarantees to the private sector for risky projects, while governments and philanthropies should de-risk non-bankable projects through guarantees rather than subsidise the profits of the private sector.

Governments can access and reallocate resources for non-bankable projects by phasing out agricultural subsidies to the meat industry and energy subsidies to the fossil fuel sector. Foreign debt could be converted into local currency for investment in, for example, the energy transition, which benefits all. Increasing corporate taxes and minimizing tax evasion

and avoidance can reduce inequalities while generating resources for funding non-bankable projects. Debt relief must also be explored as a means to enable developing countries' national investment in climate mitigation and adaptation. Collaboration with the biodiversity, water and health ministries can enable a more integrated transformation.

Private investors should be required to meet minimum environmental, social and governance criteria and integrate climate risk, stranded asset risk and litigation risk into their balance sheets as required (to some extent) in the EU (Hummel and Jobst, 2024; Kelly, 2021). They need to ensure not only that scope 1, 2 and 3 emissions are reported but also that emissions are minimized. Profits that currently flow up to board rooms, CEOs and shareholders need to be invested in reducing not only company emissions but also those in their entire supply chain. It is necessary to verify that companies claiming Paris compliance are genuinely compliant and do not grandfather their emissions to claim such compliance: Many companies claim to be net zero by 2050, but this leaves little space for other companies, smaller companies or developing country companies to use fossil fuels.

Just partnerships: Just partnerships are needed to promote the energy transition. No individual company, region or country can function alone in this transition. All actors use fossil fuels, and unless strategic actors work together, different bottlenecks can affect the transition. For example, it is not enough for households, renewable energy companies and governments to work together if the grid is not expanded, as is currently the case in Europe.[2] Four types of partnerships are envisaged: partnerships between states to promote the energy transition (e.g., the Just Energy Transition Partnership; see Karg et al., 2025, for a critique), between actors within a value chain (e.g., promoted by Chief Procurement Officers), between like-minded groups (e.g., youth, NGOs, scientists to ensure a common front) and between like-minded sectors (e.g., environment, health, water and biodiversity to ensure a coherent narrative).

Inferences

CSJ requires systemic change to our development paradigm. It requires procedural and substantive justice. It is operationalized through the ends of adoption of climate-related safe and just Earth system boundaries, and that minimum needs are met without the use of fossil fuels. In terms of means, it requires addressing the drivers of climate change and inequality, and clear principles of liability to counter harm/risk and promoting the fair allocation of the remaining carbon budget and fair distribution of responsibilities.

V. Conclusion

This article asked: How have climate injustices manifested and accumulated in the global response to climate change, and how can a deeper understanding of these injustices inform approaches to managing the problem of climate change? We conclude that, first, climate change cannot be addressed without a just approach. At a North–South level, squeezing developing countries by reducing the carbon budget so that they have very little to use and adopting border tax adjustment mechanisms to force them into alternatives may not be effective. About 78% of the remaining fossil fuels are in the developing world, and there is a growing market in the global South. If rich countries cannot engage with developing countries in a just manner, they will lose control over the climate change problem. Domestically, if all countries do not support their lower middle classes and the poorest in reducing emissions, governments will fall as these groups will resist the extra costs and sacrifices forced onto them. Ironically, most subsidies benefit businesses and the upper classes, who can afford fossil fuel alternatives. Moreover, those who suffer worldwide will seek justice in court, as we see with rising court cases. Judges increasingly recognize the human

rights of people and are judging in their favour. The youth and other actors are protesting in different ways worldwide, demanding action to protect them from climate change. Without a just approach, we all lose.

Second, this article identifies six different cumulative injustices, starting with (a) the 25-year delay in adopting a long-term objective (or identifying the ecospace) weakening action; (b) postponing the equitable distribution of the ecospace, resulting in a voluntary approach (divorced from the promised principled approach of the Climate Convention); (c) failing to recognize the challenge of stranded resources and assets; (d) adopting mitigation instruments that prioritize efficiency but exacerbate equity and effectiveness; (e) delaying strategies to address impacts and residual impacts and (f) ignoring the underlying drivers of climate change, namely our linear economic system, the entrenched vested interests and power politics and the pressures to increase our GDP and 'development' at huge costs to socio-environmental justice. Without a just approach, we all lose.

Third, although many justice scholars and actors are demanding justice on individual issues, there is an urgent need for a systemic programmatic approach to address climate change in the context of related environmental and development problems. Drawing inspiration from the ESJ framework and the layered cake (Figure 1) analysis, we present a systemic programmatic approach within which efficient, effective and equitable sectoral and instrumental strategies are possible. This approach argues in favour of meeting ends (i.e., observing safe and just climate boundaries and meeting minimum needs using non-fossil energy), calling for a programmatic approach to understanding energy within an inclusive development paradigm to address the root causes of climate change and inequality, and to share the remaining carbon budget based on specific principles. Responsibility for harm caused to others must take centre stage. Governments need to share responsibilities to ensure that we do not miss the 1.5°C target by implementing rapid policies to avoid crossing tipping points. We are in a global climate emergency, possibly requiring emergency measures with a safety net to enable the rapid transformation needed. The question is: Are our democratic systems up to the challenge of undertaking science-based policy to protect the furthest behind first, ourselves, our children and the natural systems that have enabled us to prosper? Will they realize that without a just approach, we all lose?

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship and/or publication of this article: This project has received funding from the European Research Council under the European Union's Horizon 2020 research and innovation programme (grant agreement No 101020082). It is in line with our work for the Earth Commission.

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Notes

1. The Kyoto Protocol and the Doha Amendment covered the period 2008–2020.

2. https://www.euronews.com/green/2025/05/13/europes-electricity-grid-is-outdated-and-risks-derailing-fossil-fuel-phase-out-report-find

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