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Climate Justice

What it is and how it relates to other justice concepts and components

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Contents

1 Introduction 5

Federico Voltolini, Alexandra Tomaselli and Jessica Balest 5

2 Climate (in)justice and social (in)equality 7

Jessica Balest and Federico Voltolini 7

2.1 A definition of social inequality and its history 7
2.2 Inequality and climate justice 8

3 Climate justice tenants 10

Federico Voltolini, Jessica Balest and Alexandra Tomaselli 10

3.1 Distributive justice 10
3.1.1 Distributive justice in policies and actions 11

3.2 Procedural justice 13
3.2.1 Procedural justice in policies and actions 13

3.3 Corrective justice 14
Corrective justice in policies and actions 14

4 Climate justice and resilience 16

Adriana Recalde Martínez, Federica Romagnoli, Anna Lea Bernhard von Schlechtleitner and Lydia Pedoth 16

4.1 Resilience and distributive justice 17
4.2 Resilience and recognitional justice 18
4.3 Resilience and corrective justice 18

5 Climate justice and socio-ecological transformation 20

Mirjam Gruber 20

6 Climate justice, (eco)feminism, and gender equality 23

Mirjam Gruber and Federico Voltolini 23

7 Climate justice and intersectionality 24

Alexandra Tomaselli and Alexandra Cosima Budabin 24

8 Climate justice and vulnerability 26

Isidoro De Bortoli and Jessica Balest 26

8.1 How vulnerability and climate justice converge: lessons from Bangladesh 27

9 Climate justice and activism (Who is involved in climate justice?) 29

Adriana Recalde Martínez and Alexandra Cosima Budabin 29

10 Climate justice and other dimensions of justice 31

Federico Voltolini, Alexandra Tomaselli and Isidoro De Bortoli 31

11 Conclusions 34

Jessica Balest and Alexandra Tomaselli 34

12 References 37

13 Annex 1 47

1 Introduction

Federico Voltolini, Alexandra Tomaselli and Jessica Balest

The latest IPCC[1] report underscores once again that human activities, particularly through greenhouse gas emissions, are the primary drivers of global warming. In 2023, atmospheric CO_2 concentrations reached 419 parts per million—the highest level recorded in at least 2 million years (Copernicus, 2024). Elevated levels of CO_2 and other greenhouse gases intensify the greenhouse effect, causing a steady rise in global temperatures. Between 2011 and 2020, the global surface temperature increased by 1.1°C compared to the 1850–1900 average (IPCC, 2022). This warming has contributed to a surge in extreme weather and climate events across all regions, leading to significant adverse effects on natural ecosystems and human societies. As a result, addressing climate change has become a critical focus in political agenda and a growing concern across the globe (Windegger & Kircher, 2024).

Climate change impacts, from a changing climate to measures undertaken to halt it, often create or exacerbate injustices and raise ethical and inequality issues, regarding the distribution of impacts and responsibilities, and the involvement in decision-making processes related to climate change. Therefore, climate change – and the transformation it calls upon or results into – is inherently a justice issue, and it is thus of utmost importance to complement studies on the former with studies on climate justice. On the one hand climate justice is a theoretical, analytical and practical framework that allows to examine climate change responsibilities, impacts, risks, and responses through a justice lens (descriptive goal). On the other hand, it helps navigating the development of policies and actions for both mitigating and adapting to climate change, incorporating justice considerations (normative goal). Understanding climate justice requires grasping both the values and ethical principles that should guide our response to climate change and the ways in which activism and movements are shaping their political and legal demands for climate justice (Edwards, 2020) as well as climate governance more broadly (Kuyper et al., 2018).

Climate justice is a multifaceted concept, by more recent scholarship often framed around four key tenants —distributive, procedural, recognitional, and corrective. These tenants encompass the equitable distribution of benefits, risks, and responsibilities, as well as the acknowledgment of identities and the fairness of procedures and processes (Kuehn, 2004; Bulkeley et al., 2013; Schlosberg, 2013). The concept of environmental justice applies these principles analytically and normatively to the environments where people live, work, and play (Santana & Novotny, 2002). In contrast, energy justice focuses on the interplay between energy systems—spanning production, transmission, distribution, consumption, and policies—and societal, political, and economic structures (Sovacool & Dworkin, 2015; Jenkins et al., 2016; Heffron & McCauley, 2017). Another dimension is provided by social justice, which emphasizes rights, duties, and opportunities within existing societal structures and among social groups (Rawls, 1971; M. Nussbaum, 2006). Meanwhile, climate justice examines the responsibilities, impacts, risks, and responses to climate change, considering the intersections of infrastructures, natural ecosystems, and societal arrangements (Sultana, 2022; Albertyn et al., 2023). Thus, researchers and activists engage with multiple dimensions of justice in both scientific and public discourse, offering a comprehensive framework to observe and analyse processes and systems through the lens of justice.

[1] The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. The IPCC prepares comprehensive Assessment Reports about the state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place. It also produces Special Reports on topics agreed to by its member governments, as well as Methodology Reports that provide guidelines for the preparation of greenhouse gas inventories. The latest report is the Sixth Assessment Report which consists of three Working Group contributions and a Synthesis Report. The Working Group I (The Physical Science Basis) on contribution was finalized in August 2021, the Working Group II (Impacts, Adaptation, and Vulnerability) contribution in February 2022, the Working Group III (Mitigation of Climate Change) contribution in April 2022 and the Synthesis Report in March 2023.

These different dimensions of justice also intersect with other concepts such as inequality, vulnerability or resilience. An in-depth understanding of climate justice requires an investigation into whether and how it relates to these other concepts, dimensions, and applications. Within the framework of the "ClimAte JuStiCe and INtersectionality: from ADaptation to Transformation – ASCEND" project, this report examines climate justice and its interrelations by pursuing two aims:

- Offering a brief overview of the development of the concept of climate justice and its current debate.

- Exploring synergies and differences between climate justice and interrelated concepts and debates, including resilience, socio-ecological transformation, feminism and gender equality, intersectionality, vulnerability and migrations, and activism.

First, tracing the origins of climate justice reveals how it emerged as a response to the unequal distribution of environmental harm and benefits. As mentioned, and further discussed below, it has roots in environmental justice movements that highlighted the disproportionate impact of pollution and resource depletion on marginalized communities. Key milestones, such as the 1992 Rio Earth Summit, the 2000s Kyoto Protocol, and the Paris Agreement, illustrate how the dialogue has evolved from broad environmental concerns to explicitly integrating equity and justice. Highlighting these developments provides context for how the concept is framed and debated today.

Second, while the concept of climate justice today is a cornerstone of international policy and advocacy, it remains contested, and it does not operate in isolation (Amorim-Maia et al., 2022). Integrating insights from other disciplines and justice concepts (and conceptualizations), dimensions and applications helps to provide a more systemic understanding. This exploration offers new insights into climate justice and its interconnections with broader socio-ecological dynamics.

This report is thus organized as follows. Section 2 links the evolution of the studies on inequalities to climate justice by highlighting how the uneven and asymmetric access to resources and their distribution reflects the main inequality principles that characterizes climate (in)justice as adopted by many sectors and scientific disciplines today. Section 3 offers a systematic overview on the most prominent definitions of climate justice in accordance with the related scientific literature followed by a critical analysis and understanding of what climate justice may imply in climate change research. Sections 4-10 include a diagnosis of concepts and debates that are closely linked to climate justice but have been usually dealt with apart from each other thereby fostering cross-fertilization among conceptualizations and building bridges among different understandings. Finally, section 11 offers some concluding remarks and hints for future research pathways, and Annex 1 includes a summary of the main concepts and debates.

Finally, the authors are aware of the limits of this report. First, concepts and related debates are here depicted carefully but in a concise form. The report is thus far from being exhaustive. In particular, this report focuses more on individuality aspects and, e.g., a debate on climate justice and intergenerational equity is missing. Authors hope to tackle this and other fundamental debates in future research.

Note on the elaboration of this report

This document is a collaborative effort, with each chapter authored by different contributors and refined by others acknowledged within its pages. As a result, the readers may find diverse writing styles and partly seamless interconnections between chapters, but the possibility to explore each chapter independently.

2 Climate (in)justice and social (in)equality

Jessica Balest and Federico Voltolini

2.1 A definition of social inequality and its history

Social inequalities consider the different distribution of resources, e.g. infrastructural, social, economic ones, leading some social groups or some areas of a city or a territory to be vulnerable or marginalized, where social and material vulnerability means living in a condition of uncertainty, which can turn into real economic and social deprivation (e.g. poor health, substance use, lack of economic resources for a minimum quality of life, etc.) (Banks, 2007).

Social inequality is characterized by the existence of unequal opportunities and rewards for different social positions or statuses within a group or society. There are diverse categorizations of inequalities, such as inequalities of opportunities versus inequalities of conditions, where the first refers to the unequal distribution of life chances across such as level of education and health status, and the second refers to the unequal distribution of resources such as income, wealth and material goods (Crossman, 2018). Other apply vertical and horizontal considerations, referring to inequalities defined by higher or lower socio-economic status (vertical) or inequalities linked to different lifestyles and milieus defined by specific characteristics (horizontal) (Gantioler et al., 2023).

Inequalities become a vicious cycle for the individuals and social groups that are most vulnerable. Usually, inequalities accumulate, so an income-related inequality between more and less affluent social classes usually becomes an inequality related to access to services, for example in relation to educational level and access to health services as well as to power structures.

The concept of inequality has been central to understanding society, especially in the context of class divisions. According to Karl Marx, societies have always been structured around class differences and unequal access to material resources. These inequalities, however, are not natural; they are socially, historically, and politically constructed. Each society makes political choices about how to organize property, borders, education, and taxation, which leads to different levels and forms of inequality depending on the balance of power between social groups. Inequality, if defined as an unequal distribution of resources such as wealth, power, and prestige across individuals and groups, was strictly connected to social classes that can be understood in three main ways: (a) as groups formed based on economic power and resources, (b) as groups defined by status, reputation, or lifestyle, and (c) as social or political actors in competition with other classes.

Social inequality can also be structured into the society—connecting to the concept of social stratification (Parsons, 1953; Fasang & Aisenbrey, 2022;)—and since the late 18th century, movements and political struggles have sought to transform these class-based inequalities by challenging the dominance of ruling classes and establishing new social, political, and economic norms. This shift is central to the study fields that contribute to understand the causes of inequalities as societies undergo political, economic, and social changes.

While earlier studies focused on class based on occupation, recent approaches have incorporated socio-cultural factors, such as lifestyle and consumption habits, to understand how classes are formed and maintained. Indeed, social inequality is a matter of diverse research topics such as circular economy, green and energy transitions, urban transitions, gender studies, and impacts of climate change (e.g., heatwave) (Chancel, 2021; Derdouri et al., 2025).

For example, the most vulnerable social groups to heatwaves, a growing issue in urbanized areas, are the ones having less access to green spaces and cooling services (Derdouri et al., 2025). Even, elderlies and ethnic minorities, are more likely to suffer and die from heatwaves because of reluctance to leave their homes due to low feelings of security in their poor neighbourhoods. In contrast, richer people work and live in offices, shopping malls, where low-income people do not have access. “Ironically, richer groups consume the highest rates of air conditioning and emit the most carbon” (Marks & Connell, 2024, p. 2889). Therefore, air conditioning increases heat islands in the outdoor environment. These examples show how inequalities and climate injustice are interconnected.

2.2 Inequality and climate justice

Social inequality and justice are deeply connected because both address fundamental questions about fairness, rights, and distribution (Barrett, 2013; Newell et al., 2021; Albertyn et al., 2023). Inequality, as discussed above, is the uneven distribution of resources and opportunities, whereas justice concerns the principles by which the (un-)fairness is determined and the distribution should be organized. Indeed, the negative consequences of climate change do not affect all people equally. On what characteristics these inequalities arise and grow also depends on the context and what is considered fair or not fair in certain cultural and geographic contexts.

In South Tyrol, for example many perceive that everyone is affected by climate change (Windegger & Kircher, 2024). The analysis of the region's inequalities can be primarily linked to geographical and infrastructural issues, such as living in areas prone to flooding or landslides. In contrast, in the Global South, social inequalities are more linked to socio-economic disparities like income, education, and access to basic services (Recalde Martínez et al., Forthcoming). These disparities directly relate to the vulnerability of certain social groups, making them more susceptible to the impacts of climate change.

This is where the concept of climate justice comes into play. Climate justice highlights the inequalities that arise from the uneven distribution of climate change's consequences. As Velasco-Herrejón & Bauwens (2024) state, climate justice fundamentally is about paying attention to how climate change impacts people differently, unevenly, and disproportionately, as well as redressing the resultant injustices in fair and equitable ways. To deal with climate justice, inequalities should be reduced by distributing resources equally to fight climate change and receive any shocks. Indeed, inequalities are often due to disparities in the distribution of resources (e.g., housing, infrastructures, relational networks that can support in case of emergency) and issues (e.g., poverty, health conditions).

While inequalities are the main object of distributive justice, they can be also recognized in other components of climate justice. Horizontal social inequality—differences between cultural or social groups—can lead to recognitional injustice when diverse traditions and practices are not respected, such as when implementing green public spaces. Vertical social inequality—differences in education or power—affects procedural justice by limiting some groups' ability to participate in decision-making processes. As Velasco-Herrejón & Bauwens (2024) explain, consultations meant to promote participation often obscure the unequal distribution of power, allowing only certain groups to engage while others remain invisible. In addition, distributive (in)justice refers to unequal distribution of climate change related risks and benefits of adaptation and mitigation policies.

In sum, climate justice requires recognizing and addressing the various forms of inequality that shape how different groups experience and respond to climate change, but there are diverse causes that do not make possible the emergence of transparent issues related to inequalities.

In conclusion, social inequality is a multifaceted as the justice concept, which encompasses economic, social, and symbolic dimensions. It is not a natural phenomenon but a socially constructed one. The interaction between inequality and climate justice is central to understanding the distribution of resources, opportunities, and power within societies in order to empower individuals in fighting and responding to climate change. From Marx's critique of capitalist class divisions to contemporary studies on urban inequality and environmental and social justice, the quest for a fairer distribution of resources and the mitigation of inequality remains a core concern in social sciences. As societies continue to evolve, so too must our understanding of the mechanisms that produce and sustain inequalities, as well as the paths toward achieving greater climate justice.

3 Climate justice tenants

Federico Voltolini, Jessica Balest and Alexandra Tomaselli

Climate justice is a theoretical, analytical and practical framework that allows to examine climate change responsibilities, impacts, risks, and responses through a justice lens (descriptive goal) and develop policies and actions for both mitigating and adapting to climate change, incorporating justice considerations (normative goal).

The term climate justice is used in this report as an analytical framework (section 3.1) and as a guiding principle for mitigation, adaptation and loss and damage policies and measures (section 3.2). Examining responsibilities, impacts, risks and response to climate change through a climate justice lens means applying different principles of justice. Literature on climate justice typically identifies four main tenants: distributive, procedural, recognition, and corrective (Kuehn, 2004; Bulkeley et al., 2013; Sovacool et al., 2019; Gantioler et al., 2023). These are briefly outlined in the following paragraphs, drawing from literature focused on both descriptive and normative goals. Specifically, the subsequent sections will explore the concept of climate justice tenants and provide an overview or examples of their application in mitigation, adaptation and loss and damages policies and actions (see also Figure 2 below).

3.1 Distributive justice

Distributive justice in climate change focuses on the unequal distribution of responsibilities, impacts, and risks across people and societies. Climate justice literature emphasizes that those least responsible for climate change suffer its most severe consequences, both within and between countries, a phenomenon described by Barrett (2013) as "double inequality." This refers to the inversion of responsibility and impact—where for example the Global North, responsible for most emissions, experiences minimal impacts, while the Global South, less responsible, faces the harshest consequences for livelihoods and security (Meyer & Sanklecha, 2017). This disparity is reflected in the UNFCCC's classification of nations as Developed and Developing Countries (UNFCCC, 1992).

Broadly, distributive justice also addresses how climate impacts are distributed unequally based on factors such as wealth, gender, caste, ethnicity, and class (Leach, 2015; Chancel, 2022; Sultana, 2022). Additionally, it extends to future generations, emphasizing sustainability, which balances present needs with the ability of future generations to meet their own, meeting the needs of the present without compromising the ability of future generations to meet theirs (UN, 1987; Kuehn, 2004; Sovacool et al., 2019; Newell et al., 2021; Albertyn et al., 2023; Gantioler et al., 2023).

Chancel (2022)'s study on carbon emissions highlights the stark differences in emissions per capita between regions and individuals (based on income—50% poorest, middle 40% and the richest 10%) (Figure 1). Generally speaking, as Sovacool et al. (2019) point out, distributive justice could be divided into three aspects of distribution: identifying the goods and ills that are being distributed (e.g., climate change impacts and benefits, responsibilities, risks); identifying the entities between whom they are distributed (e.g., members of certain communities or stakeholders, certain generations, all of humankind or non-humans); and identifying the mode of distribution as well as what this is based on (e.g., status, gender, socio-economics).

3.1.1 Distributive justice in policies and actions

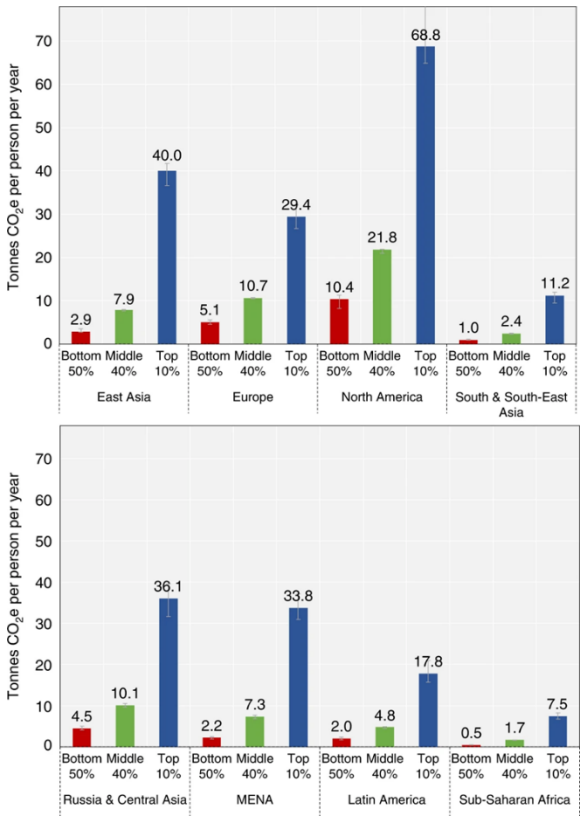

Figure 1 – Distribution of carbon emissions in regions and according to income. Source: Chancel, 2022.

The literature on distributive justice often centres on the equitable allocation of the "carbon budget" (Meyer & Roser, 2006; McKinnon, 2015; Schulan et al., 2023). The carbon budget represents the total net amount of CO2 that humanity can emit while keeping global temperature rise within specific limits, such as 1.5°C or 2°C (IPCC, 2022). According to (Chancel, 2022) and IPCC (2022), humanity can emit 300 billion tonnes of CO2 to stay below 1.5°C and 900 billion tonnes to stay below 2°C from 2020 to 2050 (with an 83% probability). This translates to an annual per capita allowance of 3.4 tonnes of CO2 for the 2°C limit and 1.9 tonnes for the 1.5°C target (Chancel et al., 2023). However, significant disparities exist in average per capita emissions across regions and income levels (Figure 1). To address disparities in per capita emissions, which are calculated as a global average, normative research on distributive climate justice explores principles for a more equitable allocation of emission rights among individuals, within countries, between countries or generations. Meyer & Roser (2006), for example, propose three key principles of distribution: egalitarianism, prioritarianism, and sufficientarianism.

Egalitarianism advocates for equal carbon emission rights for all individuals, emphasizing equality. Sufficientarianism, on the other hand, contends that inequalities are morally acceptable as long as everyone has "enough" to meet basic needs, necessitating the establishment of a minimum emissions threshold (Frankfurt, 1987). Prioritarianism prioritizes the distribution of benefits, suggesting that individuals who would gain the most from emitting—assuming emissions correlate with economic growth and well-being—should have greater emission rights than those who have already achieved a certain level of well-being. Each of these approaches faces criticisms, as discussed by Meyer & Roser (2006). Additionally, other scholars, such as De Vries et al. (2024), have explored alternative frameworks for categorizing principles of distributive justice.

At the policy level, the carbon budget is the principle on which the so-called cap-and-trade mechanism is based. The cap-and-trade system is a market-based policy tool designed to control GHG emissions by placing a limit (or "cap") on the total emissions allowed within a specific jurisdiction (Haites, 2018; Narassimhan et al., 2018; Santos, 2022).

Under this system:

- Cap: The government or regulatory body sets a total limit on emissions, often aligned with climate policy goals (e.g., the Paris Agreement). Emission permits, also called allowances, are distributed to firms or Nations either for free or through auctions.

- Trade: Firms or Nations that emit less than their allowance can sell excess permits to others that face higher reduction costs. This creates a financial incentive for companies to innovate and reduce emissions.

The cap-and-trade mechanism and carbon budget framework, though prevalent in climate policy, face criticism for oversimplifying the complex interplay between emissions, economic growth, and well-being. These approaches often focus narrowly on emission reductions while neglecting equity, technological innovation, and broader socio-economic impacts (Rockström et al., 2023). This has led to calls for justice-oriented alternatives that prioritize human well-being alongside environmental goals. One such proposal shifts the focus of distributive justice from the "right to emit" to the "right to well-being" (Meyer & Roser, 2006). This perspective aligns with Amartya Sen and Martha Nussbaum's Capabilities and Functionings framework (Nussbaum, 2006), which emphasizes enabling individuals to achieve valuable states of being (functionings) and expand their opportunities (capabilities). Sen argues that equitable climate policies should not only reduce emissions but also ensure access to essentials like clean energy, education, and healthcare to support human flourishing. Following the call of considering emission rights as human rights linked for example to sufficient emissions for subsistence, Hayward, (2007) argues to rather focus on an equitable distribution of rights to ecological space, relating it to more fundamental questions of justice and the capacity of earth to absorb carbon.

In practice, adopting a capabilities-based framework could address the limitations of carbon budgets, which often disadvantage low-income nations with historically low emissions. By prioritizing well-being or right to ecological space over emissions rights, allows to approach distributive questions more fundamentally and systemically, for just pathways in addressing climate change.

3.2 Procedural justice

Procedural justice refers to who decides and participates in decision-making, ensuring that those affected by the decision will be effectively engaged in the entire decision-making process. Procedural justice is a matter of who makes decisions over what, by what means and, on whose behalf (Kuehn, 2004; Bulkeley et al., 2013; Gantioler et al., 2023;). It also focuses on seeking to unveil the fairness of the processes through which decisions are made (Sovacool et al., 2019). In this sense, climate justice literature points out that climate change affects more people and societies that are often excluded from decision-making processes regarding the responses to the problem (McCauley & Heffron, 2018; Newell et al., 2021). Moreover, one common observation is that the predominant expertise-oriented, interest-group model of environmental decision-making favors those with resources and political power over low-income communities and minorities (Kuehn, 2004). These discussions highlight how exclusions from decision-making process on climate change policies and actions risk to further alienating already marginalized communities and indigenous peoples further (Airey & Krause, 2017) or social groups including women (Albertyn et al., 2023; Khadka et al., 2014; Larson et al., 2015).

3.2.1 Procedural justice in policies and actions

Procedural justice plays a crucial role in climate justice by ensuring fairness, transparency, and accountability in decision-making for climate mitigation and adaptation. It stresses the importance of including all stakeholders in decisions that impact their lives, ensuring legitimate and inclusive processes (De Ridder et al., 2023). Scholars like Patterson et al. (2017) highlight that procedural justice empowers communities, encouraging active participation in climate policy and improving their capacity to tackle climate challenges.

Procedural justice focuses on creating governance systems where decisions are transparent, accountable, and open to scrutiny by all affected parties (Brandstedt & Brülde, 2019). This requires clear mechanisms for monitoring and regulating outcomes to prevent disproportionate harm to certain groups. Inclusivity is essential, ensuring that all voices, especially those of historically marginalized communities, are meaningfully involved in decision-making. Overcoming systemic barriers, such as unequal access to education and resources, is key to enabling full participation.

Another challenge is addressing power imbalances (Brisbois, 2019; Velasco-Herrejón & Bauwens, 2024), as decision-making can reflect entrenched hierarchies where more powerful groups dominate. Procedural justice seeks to counteract this by fostering equality through inclusive consultation processes that empower all stakeholders to share their perspectives, independently of their available resources.

While promising, implementing procedural justice faces obstacles such as deep-rooted inequalities, cultural and institutional differences, and resource limitations. These can be addressed through participatory tools, education, and capacity-building programs that help communities engage in climate governance[2], shifting from an often-hierarchical architecture of a global governance of climate change to a networked system evolving at multiple levels (Tosun & Schoenefeld, 2017). However, these efforts must be sustained and flexible to meet the evolving challenges of climate change.

In conclusion, by embedding fairness, inclusivity, and transparency into decision-making processes, it creates the conditions for a just transition that empowers all communities, particularly those most vulnerable to climate impacts. While challenges remain, prioritizing procedural justice in climate governance is essential for building a sustainable and equitable future.

[2] For further details on climate governance scholarships, see (Okereke et al., 2009; Tosun & Schoenefeld, 2017; Wang & Fang, 2024).

3.3 Corrective justice

Corrective justice is most closely related to idea of 'justice' as used in the legal domain. It is often considered part of procedural justice or distributional justice (Bulkeley et al., 2013). Corrective justice is also sometime referred as restorative justice (Trimmel et al., 2024). It includes the twofold concept that transgressors are arrested and punished to re-establish the original equality, and they cannot receive benefits for disregarding the law, and that remedies need to be provided for injuries caused by others' actions, irrespective of whether they infringe the law (e.g., environmental crime) or not (Kuehn, 2004; Gantioler et al., 2023).

Its core conceptualization includes four elements:

- When there is a negative change in a status quo or the violation of a right (e.g. the right to ecological space; see Gantioler et al. (2023) or when a person, a community or nature suffer a loss.

- The need to understand the responsibility of the violation, damage or loss, by replying to the question of 'Who is responsible', as well as defining the accountability, by asking who is to be hold accountable?

- The need for a reparation by restoring the enjoyment of the violated right (Lamont, 1941). This includes also understanding how and who should act or pay to repair, restore or compensate the violation, damage or loss. Caney (2014) identifies two concepts to deciding who is responsible for the reparation towards climate justice, by sharing fairly the burden (Burden-Sharing Justice) or preventing the violation of the right, the damage or the loss (Harm Avoidance Justice).

- The application of a punishment: this is conceived as a tool per se that prevents rights' violations or generally law infringements (Lamont, 1941). However, as (Falk, 2006) suggests, it could be conceptualized also as a way to repair the damage or loss as a moral restitution to the damaged.

Corrective justice in policies and actions

Corrective justice, as a normative concept, focuses on addressing imbalances and rectifying past wrongs to ensure fair outcomes for all parties involved. Unlike distributive justice, which emphasizes the fair allocation of resources, corrective justice aims to repair the harm caused by unfair practices or policies, often by shifting responsibilities and resources from those who have benefited unjustly to those who have been harmed (Weinrib, 2002; Caney, 2014). In the context of climate justice, corrective justice is particularly relevant, as it seeks to rectify the historical and ongoing disparities in carbon emissions and climate change impacts between the Global North (Developed Countries) and Global South (Developing Countries).

The concept is rooted in the recognition that the Global North or Developed Countries, with its higher per capita carbon emissions, has disproportionately contributed to the environmental damage and risks faced by the Global South or Developing Countries (UNFCCC, 1992). As a result, corrective justice advocates for reparations, climate finance, and other mechanisms that address the unequal burden borne by vulnerable populations. One prominent example is the notion of "loss and damage," which has emerged in international climate negotiations. Loss and damage refer to the impacts of climate change that cannot be mitigated or adapted to, such as the destruction of homes, livelihoods, or ecosystems, often experienced by communities in the Global South (McNamara & Jackson, 2019).

To implement corrective justice, it is necessary to acknowledge and address these historical injustices by redistributing resources, technologies, and support to help vulnerable countries cope with the consequences of climate change. This involves not only financial compensation but also a commitment to long-term solutions, such as providing climate adaptation funds and facilitating the transfer of clean technologies to developing nations. Corrective justice, therefore, plays a critical role in advancing a just transition, ensuring that those who have contributed least to climate change but suffer its most severe impacts are given the support they need to recover and adapt, also future generations.

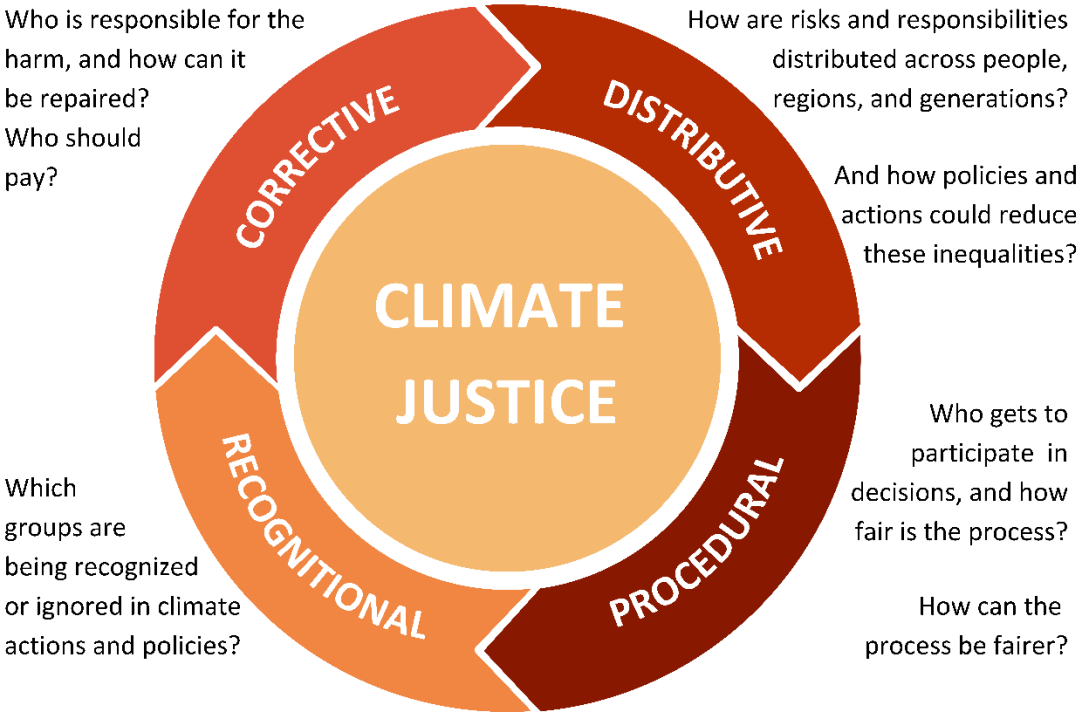

Figure 2 – An overview of the main tenants of Climate Justice and some of the critical questions they address

4 Climate justice and resilience

Adriana Recalde Martínez, Federica Romagnoli, Anna Lea Bernhard von Schlechtleitner and Lydia Pedoth

Latest international guidelines and frameworks for building climate resilient societies calls for justice-oriented approaches in the development of climate change adaptation and mitigation strategies (e.g., IPCC Reports, EU Green Deal, EU Climate Adaptation plans, local adaptation plans, etc.). The 6th IPCC Assessment Report identifies justice as a fundamental component of climate adaptation at all levels of government, stating that the achievement of climate resilient societies can only be attainted through a justice-oriented approach (IPCC, 2022). Following this approach the Working Group II specifically highlights the need for including justice considerations while assessing adaptation solutions (IPCC, 2022). Climate resilience and climate justice thus appear to be the cornerstone of climate change adaptation and mitigation strategies and are merged in the "just transition[3]" or "just resilience" approach.

Beyond being claimed by the international research community, the "just transition" approach also underpins the development of Adaptation Strategies at European level, and it is thus the helm for defining and implementing local adaptation strategies, ensuring that social justice and equity are embedded in all stages of socio-ecological transformation (Breil et al., 2021).

In this chapter, we discuss the development and integration among the foundational theoretical concepts of just resilience–i.e. climate justice and climate resilience–to identify how the concepts evolved overtime and have characterized the climate justice debate. In particular, we will focus on the development of the concept of resilience, climate resilience and the incorporation of justice within the climate resilience framework.

Climate resilience is one of the latest developments of the resilience concept. It is defined by the IPCC as 'the capacity of social, economic and environmental systems to cope with a hazardous event or trend, […] while also maintaining the capacity for adaptation, learning and transformation' (IPCC, 2019).

This concept relies on the core features of resilience, namely adaptivity and flexibility, that allows any complex system (e.g., ecosystems, societies, cultures, coupled human and natural systems, cities, etc.) to adapt and modify their interactions to be able to overcome a stressor or a shock without modify system functions .

The concept of resilience was first presented by Holling (1973) referring to the ability of an ecosystem to modify the relations among its components to absorb changes while maintaining its essential functions (Holling, 1973). Starting from this definition the approach evolved overtime and expanded to multiple fields, such as psychology, engineering, urban planning, and social sciences, giving rise to multiple definitions (Alexander, 2013; Folke, 2016; Wyss et al., 2022).

Nowadays resilience has characterized and strongly shaped research on sustainable development, socio-ecological systems and human-nature interactions in recent decades (Folke, 2016; Walker, 2020). Its features have been fully integrated within the climate adaptation discourse and the promotion of sustainable development within the context of climate change as the achievement of sustainable development will necessarily entail transformation in multiple systems and dimensions.

[3] Just transition concept first emerged as a labor-oriented concept from North American unions in the 1970s. It has since broadened and found particular traction in the climate change context as impact of climate change are uneven. The just transition concept addresses several dimensions of inequalities, vulnerability and socio-ecological transformation (Marquez Ferrer et al., 2019).

Climate resilience became the guiding goal of many multi-scale adaptation efforts (Cañizares et al., 2024). However, there are still a lot of unanswered questions about how climate resilience efforts intersect with the concept of justice and the consideration if achieving an equitable and just transition. In the paragraph below are examined some of the interconnections among the key type of justice mentioned in the just transition approach and outlined in IPCC reports as well as in the European Adaptation Support tool.

The most common definitions of resilience

Here after we briefly mention the most common definitions of resilience depending on the research field:

- **Ecological resilience:** Ecological resilience is defined as the capacity of an ecosystem to absorb disturbances and reorganize while undergoing change, so that it retains essentially the same functions, structure, and feedback. This concept emphasizes the ecosystem's ability to maintain its core characteristics despite external pressures or disruptions (Holling, 1973).

- **Socio-ecological resilience:** Socio-ecological resilience refers to the capacity of interconnected social and ecological systems to absorb disturbances, adapt, and reorganize in response to change while retaining essential structures, functions, and feedback (Folke, 2016).

- **Community resilience:** Aldrich describes community resilience as the collective ability of a community (conceived as neighbourhood or geographically defined area) to deal with stressors and efficiently resume the routines and daily life through cooperation following shocks (Aldrich & Meyer, 2015). Kruse et al. expand the concept of community and apply a dynamic and multi-layered understanding of community, including community as a place-based concept, as a virtual and communicative community within a spatially extended network or as a imagined community of individuals who may never have contact which each other but who share an identity or a common interest (Kruse et al., 2017).

4.1 Resilience and distributive justice

Resilience now is the ‘philosophy’ that informs most climate adaptation efforts (Fitzgibbons & Mitchell, 2019). Nevertheless, it becomes impossible to reach a whole community-fair level of adaptation without having a look on how climate change risks, impacts and responsibilities are differently, unevenly and disproportionately distributed between people and societies. Thus, focusing on resilience without a distributive justice approach would lead to a situation where root-cause inequalities go unexamined, creating new climate vulnerabilities or exacerbating pre-existing ones.

Critical studies on resilience emphasize the need to adopt distributive justice insights. First, because the benefits of achieving a ‘climate resilient’ society must be shared broadly and equitably, considering the vulnerabilities of different social groups: individuals, communities or entire nations. Likewise, distributive justice reaches not only a spatial but a temporal scope, so that a generational perspective must be followed since resilience aims to reach the capacity of systems to cope with future changes (Raub et al., 2023). And, unsurprisingly, those future generations must be prioritized not only as recipients of a fair adaptation process, but also as key actors for reaching climate resilient systems.

4.2 Resilience and recognitional justice

Recognitional demands advocate for the inclusion of those who have been left on the margins. It expresses a call for accepting gender, youth, migrant or other minorities' differences across groups of people, but also claims that present injustices are, in most cases, the result of structural and historical forms of oppression (Whyte, 2017; Coolsaet & Néron, 2020). A must of any notion of resilience should consider an uneven exposure to climate change effects but also the diverse adaptative capacities among the groups, to “leave no one behind” (Gómez-Lee, 2019).

Linked to the achievement of social and ecological resilient systems, recent literature points out the benefits of “planning from margins” (Satterthwaite, 2017). Thus, an entire society can benefit by focusing the needs on vulnerable groups. For instance, if children are more susceptible to disease, combating that specific vulnerability by improving water and sanitation infrastructures or better health care services will benefit not only children´s life, but also the whole community. It is fundamental to prioritize those most marginalized and vulnerable people in terms of demanding new adaptation strategies (Paul Tm, 2024).

4.3 Resilience and corrective justice

A capability approach centred on climate resilience can sometimes fall short by overlooking issues of corrective justice (Táíwò, 2022). Resilience thinking, by focusing on responding to stress and shocks, may overlook the causes of climate risks, particularly non-climatic factors that create vulnerability. This can be seen as neglecting socio-institutional injustices and issues of corrective justice, such as reparations for victims and sanctions for those responsible for past harm (Cañizares et al., 2024).

However, resilient-adaptive measures and a corrective justice approach are not only compatible but also converge. Thus, we understand that restorative justice emphasizes the victims´ right to reparation for past harms, while retributive justice seeks to punish offenders for wrongdoing. Now, Taiwo's theory will lead to bind reparations to questions of adaptation finance and targeting. More specifically, it suggests that high GHG emitters should finance adaptation actions for low emitters. This is because high emitters bear greater responsibility for human-induced climate change and the resulting reduced climate resilience of low emitters (Füssel, Hans-Martin, 2010). In conclusion, we can observe how responsibilities for mitigation are often assigned on a retributive basis, and there is no reason why these concerns should not also inform adaptation efforts to reach resilience.

Moving from the theoretical to the empirical and practical application to the just transition concept we can find several examples at European level. Beyond the analysis developed in the ETC/CCA Technical paper “Leaving No One Behind” in Climate Resilience Policy and Practice in Europe (2021), the EU also carries out several initiatives to support the dissemination of additional information and implementation strategies for just resilience policies and measures to practitioners and policy makers. For instance, the Economic and Social Impact of Research (ESIR) expert group offers the Commission evidence-based policy recommendations on how to create equitable, progressive, and revolutionary research and innovation policies. The European Commission and the EEA are creating the European Climate and Health Observatory in cooperation with other EU and international partners. It gives users access to the most up-to-date information available on social groups' susceptibility to risks and effects of climate change connected to their health as well as on fairness in policy responses (EEA, 2024).

In conclusion, climate resilience and climate justice are deeply interlinked, with equity-focused approaches being recognized as essential for effective climate change mitigation and adaptation. The IPCC's 6th Assessment Report (Weinrib, 2002; Caney, 2014) highlights equity as a cornerstone of climate-resilient societies. Recent resilience frameworks integrate distributive, procedural, recognitional and corrective justice, addressing inequalities in climate risks, participation, representation and

accountability. European initiatives, such as the Climate and Health Observatory, demonstrate practical applications, and together these approaches ensure equity in socio-ecological transformations and promote sustainable and inclusive climate adaptation strategies.

5 Climate justice and socio-ecological transformation

Mirjam Gruber

Social-ecological transformation refers to the deep, systemic changes needed in our social, economic, and political systems to transition to a sustainable, equitable, and climate-resilient future (Malakar et al., 2023). This includes transforming the underlying drivers of environmental degradation, such as unsustainable production and consumption patterns, unequal power structures, and extractive economic models. At the heart of this relationship is the recognition that climate change is fundamentally a social and political issue, not just an environmental one. The impacts of climate change exacerbate existing inequalities, with the poorest and most vulnerable populations bearing the greatest burdens. A social-ecological transformation that centres climate justice must therefore address these structural inequities and power imbalances.

Socio-ecological transformation recognizes that social challenges, such as inequality and justice, are deeply intertwined with ecological concerns, like climate change and resource depletion. For instance, climate change exacerbates water scarcity in many regions by intensifying droughts and altering rainfall patterns, which directly depletes freshwater resources. This, in turn, heightens social inequalities as marginalized communities often lack the infrastructure or means to secure alternative water sources, leading to further injustice. Effective solutions must address both dimensions simultaneously (Kuhar et al., 2021).

Advocating for profound changes in societal structures rather than relying solely on technical innovations or minor policy adjustments is central to the concept of socio-ecological transformation. This comprehensive approach is regarded as essential for addressing global challenges effectively (Atzmüller, 2019; Pichler, 2023). The transformation process aims for democratic participation in decision-making, ensuring that diverse voices are included, particularly those from marginalized communities. This inclusivity is essential for creating equitable and sustainable energy and resource management systems (Pichler, 2023). While socio-ecological transformation is a global concern, it also has local manifestations. For instance, efforts to promote sustainable agriculture could include supporting small-scale organic farming in rural communities or establishing urban gardens in cities to address food insecurity. Localized responses to climate change, such as constructing sea walls to protect coastal towns or restoring mangroves to prevent erosion, further highlight how global issues are addressed in specific, community-centred ways. Different regions may face unique challenges and opportunities, necessitating tailored approaches that consider local contexts and power dynamics.

The concept of socio-ecological transformation draws from various academic fields, including social and political ecology, which offer frameworks for understanding the complex interactions between human societies and their environments. These theories provide valuable insights for developing strategies that promote both sustainable development and social justice (Brand & Wissen, 2017). There are numerous approaches and perspectives on how socio-ecological transformation can be addressed, reflecting the diverse ways in which societies can work toward more sustainable and equitable futures. A central perspective in this context is the critique of the growth paradigm, with approaches like degrowth advocating for a shift away from endless economic expansion in favour of more sustainable and equitable ways of organizing society.

Indeed, the degrowth approach is closely connected to the field of socio-ecological transformation. Degrowth advocates for a planned reduction in energy and resource use in order to bring the economy back into balance with the living world, while also reducing inequality and improving human well-being (Schmelzer & Vetter, 2024). Degrowth challenges the prevailing economic model that prioritizes endless

GDP growth as the primary measure of progress, arguing that this approach is both ecologically unsustainable and socially unjust. Also, a socio-ecological transformation approach emphasizes the importance of respecting the planet's resource limits and restoring ecosystems' regenerative capacities, calling for a shift away from overconsumption and unsustainable production (Kallis et al., 2018). Both, degrowth and social ecological transformation focus on promoting social equity, addressing issues like poverty and inequality through initiatives such as basic income grants and reduced working hours (Eversberg & Schmelzer, 2018). They advocate for systemic, transformative changes, recognizing that incremental reforms are inadequate to tackle the interconnected crises of society and the environment. Degrowth proposes moving beyond GDP as a measure of success, instead focusing on indicators like health, education, housing, and sustainable work to ensure human and ecosystem well-being. In essence, these frameworks call for a radical rethinking of how societies and economies function to create a more just, sustainable future[4].

Dengler & Lang (2022) explore how integrating feminist perspectives into degrowth can enhance our understanding of social reproduction and the collective management of resources, thereby contributing to a more just socio-ecological transformation. The authors argue that care work and *commoning* practices are crucial to building just, sustainable and convivial societies. By centring care and challenging the structural racial, gender, and social inequalities perpetuated by growth-dependent economic systems, feminist degrowth visions offer pathways for radical socio-ecological change that respects ecological limits and prioritizes social equity (Dengler & Lang, 2022).

Another example is the Doughnut model, developed by Kate Raworth, that aligns closely with the field of socio-ecological transformation by offering a visual framework (Figure 3) that combines planetary boundaries with social foundations to define a "safe and just space for humanity" (Raworth, 2017). The inner ring of the Doughnut represents the social foundation, ensuring that all people have access to essentials like food, water, healthcare, and education, while the outer ring represents an ecological ceiling that limits human impact on Earth's life-support systems, such as climate stability and fertile soils. Sustainable development occurs within the space between these two rings, where human needs are met without exceeding planetary limits. The Doughnut model serves as a guiding framework for policymakers and communities, helping to transition towards more sustainable and equitable economies. It also provides a method for measuring progress toward sustainable development by evaluating how well societies meet social needs while respecting ecological boundaries. In essence, the Doughnut model aims to create a sustainable and just future by addressing the interconnected challenges of social and ecological well-being, which also reflects many climate justice aspects that combines planetary boundaries with social foundations to define a "safe and just space for humanity" (Raworth, 2017). The inner ring of the Doughnut represents the social foundation, ensuring that all people have access to essentials like food, water, healthcare, and education, while the outer ring represents an ecological ceiling that limits human impact on Earth's life-support systems, such as climate stability and fertile soils. Sustainable development occurs within the space between these two rings, where human needs are met without exceeding planetary limits. The Doughnut model serves as a guiding framework for policymakers and communities, helping to transition towards more sustainable and equitable economies. It also provides a method for measuring progress toward sustainable development by evaluating how well societies meet social needs while respecting ecological boundaries. In essence, the Doughnut model aims to create a sustainable and just future by addressing the

[4] For an overview see also (Gerber et al., 2020) Degrowth and environmental justice: An alliance between two movements? In B. Coolsaet (Ed.), *Environmental Justice Key Issues* (pp. 94–106). London: Routledge.

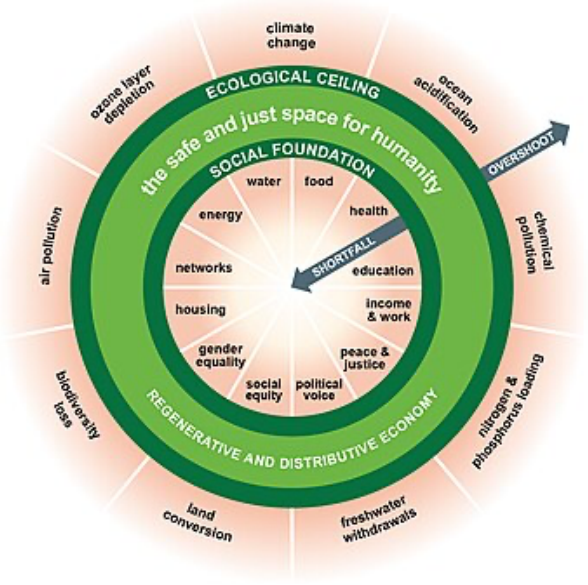

Figure 3 - The classic image of the Doughnut; the extent to which boundaries are transgressed, and social foundations are met are not visible on this diagram (Raworth, 2017).

interconnected challenges of social and ecological well-being, which also reflects many climate justice aspects (Raworth, 2017).

Furthermore, also legal perspectives can offer valuable insights into how socio-ecological transformation and climate justice can be dealt with. A rights-based approach to tackling climate change may include normative judgments tied to climate justice, which evaluate not only the effectiveness but also the equity of adaptation and mitigation efforts (Gantioler et al., 2023). Even if we are now talking about a human-rights based approach, it is relevant to overcome an anthropocentric viewpoint, attributing rights to natural ecosystems as well. A good example of this is the Whanganui River in New Zealand, which has been granted legal personhood, recognizing it as a living entity with rights to protection and restoration. This approach not only safeguards the river's ecological integrity but also honours the spiritual and cultural significance it holds for the indigenous Māori people. Certainly, integrating social inclusivity with ecological inclusivity within the framework of climate justice underscores the significance of safeguarding environmental conditions that underpin social and economic objectives and recognizes interdependence of all species and of the human and natural world (Albertyn et al., 2023).

In conclusion, the relationship between climate justice and socio-ecological transformation is essential for creating a sustainable and equitable future. While there are many perspectives and approaches within the field of socio-ecological transformation, this section touched on just a few key aspects. By addressing the needs of marginalized communities and ensuring their participation in the transformation process, society can move towards a more just and resilient world in the face of climate change. Indeed, climate justice and socio-ecological transformation are closely connected through their shared focus on addressing the root causes of environmental degradation and social inequality. Climate justice emphasizes the fair distribution of the burdens and benefits of climate change, ensuring that vulnerable and marginalized communities—often the least responsible for carbon emissions—do not disproportionately suffer its impacts. Socio-ecological transformation, on the other hand, seeks a fundamental reorganization of societal and economic systems to achieve sustainability and equity, addressing the interconnectedness of social, economic, and ecological issues. Both concepts advocate for systemic changes to reduce inequalities, promote ecological sustainability, and ensure that the transition to a low-carbon future benefits all, particularly those historically excluded from economic and environmental benefits. In this sense, climate justice is an essential component of the broader socio-ecological transformation, ensuring that the shift toward sustainability is also socially just.

6 Climate justice, (eco)feminism, and gender equality

Mirjam Gruber and Federico Voltolini

Climate justice, feminism, and gender equality are deeply interconnected movements that seek to address systemic inequalities. Climate justice emphasizes the disproportionate impact of climate change on marginalized communities, particularly women, who often bear the brunt of environmental crises. Feminism and gender equality advocate for the fair treatment and empowerment of all genders, recognizing that climate change exacerbates existing social, economic, and political inequalities. Together, these movements call for a more inclusive approach to environmental and social issues, ensuring that solutions prioritize the voices and needs of the most vulnerable, particularly women and marginalized groups.

An ecofeminist approach is particularly relevant at the intersection of climate justice, feminism, and gender equality. An ecofeminist lens on social justice examines the connections between the oppression of women and the exploitation of nature, and how addressing these parallel issues is crucial for achieving social, climate and environmental justice. Ecofeminism asserts that the domination and degradation of women and nature are interconnected, rooted in the same patriarchal structures and values that prioritize power, hierarchy, and the exploitation of the "other" (whether female, indigenous, or natural) (Miles, 2018). From an ecofeminist perspective, social justice must address both gender inequalities and environmental destruction. It calls for a shift away from hierarchical, dominating structures towards more cooperative, egalitarian, and sustainable ways of living (Federici, 2022). This involves critically examining the ways in which power is often exercised in these contexts—frequently in discriminatory and exclusionary ways that deepen social inequalities and systematically marginalize certain groups. Such an approach demands not only structural reforms but also a deeper engagement with the mechanisms through which power relations are maintained and reproduced, paving the way for more just and inclusive solutions. Ecofeminists highlight how women, especially in the Global South, often bear a disproportionate burden from environmental degradation and climate change impacts due to their roles as primary providers of food, water and energy for their families (Bove, 2021; Woo Ji, 2023). An ecofeminist approach emphasizes the need to centre the voices and experiences of marginalized women in environmental decision-making and activism. It views women as key agents of change in the fight for ecological sustainability and social justice (Woo Ji, 2023). Ultimately, ecofeminism proposes that true social justice requires challenging patriarchal power structures, recognizing the value of traditionally "feminine" qualities like nurturing and cooperation, and fostering a more holistic, interconnected worldview that respects both women and nature (Miles, 2018; Federici, 2022).

As researchers and scientists, we are responsible for integrating justice approaches and practices into our research, leading to more equitable and inclusive outcomes.

7 Climate justice and intersectionality

Alexandra Tomaselli and Alexandra Cosima Budabin

In the recent years, scholarly works have called more and more urgently for the need to apply an intersectional lens to climate justice (Versey, 2021; Amorim-Maia et al., 2022; Friedrich, 2023; Mikulewicz et al., 2023; De Jong, 2024). As reported by Mikulewicz et al. (2023, pp. 1276, 1281), until now, intersectional approaches to climate change studies have predominantly addressed how climate impacts may exacerbate social vulnerability while ignoring other aspects, such as understanding in depth the social complexity of the application of climate change adaptation and mitigation measures.

With the exception of some recent works, e.g., by Pellow (2018) and Amorim et al. (2022; 2024), the limited consideration of intersectionality within climate justice studies is however a missed opportunity in light of the urgent need to better understand the divergent impacts of climate change and to develop nuanced and informed approaches for adaption policies. Intersectionality can be instrumental in advancing climate justice research by foregrounding lesser-known vulnerabilities as well as in assuring that climate adaption processes are inclusive.

As mentioned in chapter 3, climate justice in this report is understood in a critical pluralist approach following Kuehn (2004) and others' contributions that point at multiple dimensions, including distributive, procedural, recognition and corrective justice as part of it.

Stemming from the critical race thinking, intersectionality seeks to unveil systems of social oppression. This theory (Collins, 1990; Crenshaw, 1991) enables and enhances the exploration of how various factors interact to shape multiple forms of social inequalities. For Crenshaw, identities such as being both Black and a woman, are inseparable, and treating race and gender as distinct categories is too simplistic and fails to fully capture this experience. Therefore, intersectionality highlights the importance of analysing social inequalities as a critical matrix, demonstrating how they mutually reinforce each other and intertwine with power structures thereby creating complex issues and cases of oppression in the real lives of individuals situated at the intersection of social drivers or factors such as gender, ethnicity, age, disability, class, and/or others (Whelehan, 2017, p.83).

Mikulewicz et al. (2023) have pointed at how climate justice and intersectionality share theoretical roots and methodological challenges. The authors argue that intersectional analysis enables us "to deconstruct the complex web of political, economic and cultural processes that produce sets of privileges and oppressions" in contexts of climate injustice (p. 1278). Hence, intersectionality and climate justice elevate the visibility of marginalized peoples and acknowledge that different sectors of the society or peoples are affected differently, and that social inequality is rooted in the power structures and the stratification of society, and it may be caused and exacerbated by other social drivers. Also, they both reveal and indicate means for addressing asymmetries of power and access to participation and decision-making. Indeed, when integrated into climate justice discussions, intersectional approaches are also especially useful in laying pathways for greater inclusion of diverse voices and knowledges in conceiving solutions to climate change. However, there may also be some unanticipated consequences that may arise when homing in on certain categories in devising solutions to climate change; for example, when thinking about empowering women in climate adaption practices, such approaches may risk over-burdening women and reinforce stereotypes around women as caretakers for the environment (Macpherson et al., 2024, p. 11).

Finally, research on the links between intersectional and climate justice have been helpful for thinking about building solidarity and alliances across different groups (Roth, 2021). Ecofeminism is a prominent example of this type of intersectional climate justice practice. This agenda is important for tackling racism in climate justice movements (Hall et al., Forthcoming).

Among diverse intersecting factors, gender is receiving extensive attention in climate justice debates. Indeed, intersectional approaches enable us to understand how the effects of climate change, the cause and benefits of climate change, and climate related policy development are gendered (Perkins 2018). These analyses pay attention to the women's experiences of caretaking, household work, reproductive health, as well as lack of access to decision making spheres. There is also increasing recognition of salient linkages of climate justice with the categories of youth (Thew et al., 2020; Kwauk & Wyss, 2023; Sloan Morgan et al., 2024), migrants (Mattar & Mbakwem, 2018; Chavers et al., 2021; Koubi et al., 2021), and minority communities (Sultana, 2022; Crawford et al., 2023).

Further, integrating intersectional approaches into climate adaption practices can help identify the unequal impacts of policies on diverse populations and lead to more effective interventions. For example, Amorim et al. (2022, pp. 5 and 13) have proposed how to operationalize climate justice and intersectionality in urban climate adaptation plans and policies in five components. First, the authors argue for the need to address racial and gender inequalities by examining how historical and economic aspects reinforce them with a focus on how oppressive structures and systems have particularly degraded female and non-white bodies. Second, they call for clarifying and remedying differential vulnerabilities by considering that they are caused by compounded effects including climate impacts, neoliberalism and social crises and that in this way such vulnerabilities are constantly reproduced. Third, they stress the need to critically value care politics and ethics since ca re is essential but unpaid work that needs to be provided in a fair way. Fourth, they urge centring local communities to have decolonial and situated solutions based on local and traditional knowledge. Five, they highlight that manyfold forms of activism need to be identified, recognized and promoted especially when they allow for the participation and representation and foster resilience of minoritized or marginalized communities. These components reflect the many facets of intersectional approaches to creating environments that are inclusive and empowering.

Analysing the case of Barcelona, Amorim et al. (2024), show how the strategies employed by the city of Barcelona in the period 2015-2023 have pursued a keen awareness of the intersection between climate issues and various societal dimensions, such as reducing socioeconomic disparities, respecting cultural traditions, and protecting community rights. These strategies emphasize the necessity of addressing these dimensions concurrently. By exploring the underlying mechanisms and rationales behind Barcelona's apparent success, they uncovered guiding principles, ongoing challenges, and valuable lessons that are applicable to a range of urban environments.

As discussed, intersectional approaches to climate justice must include considerations of other types of marginalization such as race and ethnicity. In the case of the Arctic, where climate change is expected to have more severe impacts than in other regions and where settler colonialism has inflicted significant harm, Friedrich (2023) has stressed how crucial it is to consider the voices of Arctic peoples, particularly those of Indigenous women that find themselves at the intersection of gender and indigeneity. Including these perspectives in climate change policymaking is essential for addressing climate change and related social issues in a manner that reduces, rather than exacerbates, inequalities and injustices. This example reflects the value of an intersectional perspective on climate justice that not only addresses unequal impacts in terms of distributional, procedural and corrective justice but also in terms of climate justice conceived intergenerationally and intragenerationally (Perkins, 2018).

By addressing the case of Irish travellers, McArdle (2021) comes to the same conclusion, that is, there is a need to listen to and involve marginalized voices to avoid that climate change exacerbates existing social inequalities. For this author, climate justice needs to be articulated not only through intersectionality but also through kyriarchy, a concept coined by Schüssler-Fiorenza (1992) that address structures of power and how they interact. Indeed, kyriarchy looks at those asymmetries of power that intersectionality creates, which applies also to how climate change is managed, and climate justice is put forward.

8 Climate justice and vulnerability

Isidoro De Bortoli and Jessica Balest

Past injustices have made certain groups disproportionately vulnerable to climate impacts. Also, unevenly distributed climate and socio-economic vulnerabilities exacerbate injustices, further deepening inequalities. Therefore, it is crucial to highlight the conceptual and practical synergies between these climate justice and vulnerability.

Vulnerability refers to the risk of harm, disadvantage, or exploitation due to exposure to environmental and social stresses, along with a limited capacity to adapt (Adger et al., 2007). When people do not have access to essential goods and services, such as safe housing or primary education, they become more vulnerable to the adverse effects of climate change (Pastore, 2020). While anyone can experience vulnerability, it is more pronounced among certain social groups, particularly where there are significant social inequalities, even if vulnerability assumes diverse understandings in diverse contexts and cultures (Brown et al., 2017). For example, residents in diverse geographical contexts are increasingly vulnerable to extreme weather events, such as frequent and severe heat waves, landslides and floods. In this case, vulnerability and exposure to potential damage affect various people with different socio-economic statuses and can impact everyone, depending on where they live. Therefore, the concept of vulnerability is a situation from which we cannot be exempt and vary along diverse geographical, socio-economic, and cultural contexts. In this case, climate justice involves rethinking land management and raising political and social awareness about climate change and the associated risks. However, other situations of vulnerability and diverse types of vulnerability can arise, as explained in the next paragraphs.

Various types of vulnerability (Biswas & Nautiyal, 2023), such as economic, social, environmental, and health vulnerability, can intersect and coincide. Economic vulnerability refers to financial difficulties that impede the ability to fulfil basic needs, such as access to food and energy, which are essential for well-being. Social vulnerability involves experiencing social isolation or discrimination, leading to exclusion and lack of support, as seen in cases of drug addiction, persons at risk of (gender-based) violence, and poor populations. Health vulnerability involves an increased susceptibility to diseases due to living conditions or lack of access to adequate medical services, particularly in areas affected by pollution or waste dumps, pandemics, or families already affected by diseases. Environmental vulnerability pertains to being exposed to natural hazards like floods, earthquakes, or heatwaves, particularly in areas with significant inequalities. Vulnerability serves as a starting point for addressing issues related to inequalities, discriminations, and various hardships (Pastore, 2020) while also tackling justice (Fineman, 2022). The concept of vulnerability has been partially integrated into the climate regime.

The impact of climate change and natural disasters on migration is one of the most significant challenges faced at both international and European levels. According to the World Bank (Clement et al., 2021). If effective climate change mitigation and adaptation policies are not implemented, an estimated 216 million people might become climate migrants by 2050, posing a serious issue of climate injustice.

Concerning the latter, climate change has created unequal and uneven burdens across different regions, emphasizing a shared yet differentiated responsibility in tackling the planetary crisis. The worsening climate breakdown has revealed profound injustices and disparities in suffering across various locations and scales. As mentioned earlier in this report, a climate justice framework provides the tools to comprehend and tackle these inequalities.

People might migrate because of climate change, which happens due to the effects that climatic events, particularly extreme ones, have on the affected countries and, as a result, on the people living there. Climate change can impact migration in multiple ways: more frequent natural disasters lead to

increased internal mobility and migration; rising global temperatures and other climatic changes adversely affect livelihoods, public health, food security, and water availability, and the decreasing availability of natural resources may lead to potential conflicts (Silchenko & Murray, 2023). The European Union (EU) has recently adopted a new pact (European Commission, 2024) on migration and asylum, recognizing natural disasters and climate change as key drivers of migration. Notwithstanding this acknowledgement, the policy does not provide legal status for individuals fleeing environmental devastation. In the absence of a legal definition, climate migrants lack protection under both international and European law. This legal void further heightens the vulnerability of the most marginalized groups, especially women, who represent 80% of those displaced by environmental factors (Waheed, 2023).

Climate justice in this area remains limited to “soft law” instruments, without binding measures for support. While climate justice is already fragile in terms of consistency, environmental migration is even weaker in terms of legal effectiveness. Despite recognizing climate change as a significant driver of migration, climate migration has yet to become a priority on the European political agenda.

Additionally, the issue is seldom addressed from a gender perspective(Rosignoli, 2024). It should also be emphasized that there are no clear indications of concrete measures to protect groups most vulnerable to gender-based violence. Furthermore, climate migration policies that address the specific needs of women, men, boys, girls, and children, within the topic are entirely absent (Gonzalez, 2021). To ensure that climate justice does not remain merely a catalyst for generating critical mass movements, it is crucial to develop legal and political frameworks for climate migrations and displacement, enabling social movements and climate-sensitive states to unite and counter national security, humanitarian, and migration management approaches. Since climate justice, much like broader environmental justice, is founded on human rights (including the rights to life, health, cultural integrity, a healthy environment, and freedom from race and sex discrimination), effective climate change policies must comply with legally binding human rights obligations.

8.1 How vulnerability and climate justice converge: lessons from Bangladesh

The complex interplay of climate change with social, economic, and political factors on migration, potentially leading to climate injustice and population displacement (Ashrafuzzaman, 2024), is particularly evident in certain concrete cases. Bangladesh is among the most vulnerable countries to the effects of climate change, with an increase around 40% of girls married before their 15th birthday (International Rescue Committee, 2024). There might be no connection between these two observations, but that is untrue.

Climate change has significantly impacted many coastal communities in Bangladesh, leading to forced migration, extreme poverty, increased gender-based violence, limited access to education, and food security challenges. The increase in child marriage is directly connected to the rise in disasters such as flooding and cyclones over the past two decades. Since most of the population depends on agriculture, extreme weather events that permanently damage these activities result in families’ immediate loss of livelihood. Consequently, many migrate to urban areas where education is not free, unlike in rural regions. In these urban settings, numerous families are compelled to marry off their young daughters to secure economic support and ensure they can continue their education. In Bangladesh, it is customary for the bride's family to provide a dowry to the groom's parents to ensure their daughter's well-being and security. For some impoverished families, a one-time dowry payment is seen as more feasible than the continuous financial burden of supporting their daughter, particularly if they have faced a loss of livelihood. Furthermore, in the aftermath of a disaster, 80% of girls experience a heavier workload at home, which hinders their ability to focus on their studies. Additionally, extreme poverty in the region impacts children's enrolment rates in educational institutions (Tewari et al., 2023).

In this context, vulnerability should be understood as the way external (climatic) events translate into welfare outcomes. Measuring climate disadvantage involves assessing the interplay of the likelihood and severity of exposure to a hazard and the vulnerability of individuals or groups to such hazards. The extent to which an individual or group is disadvantaged by a climate event depends on their level of exposure and their degree of vulnerability. But how can we measure or prevent it? This point is crucial for understanding climate justice. Relying solely on the probability and degree of exposure to a hazard to conceptualize the distribution of impacts is inadequate. It is equally important to consider how exposure to a hazard affects well-being and daily social life, as demonstrated by what is going on in Bangladesh.

The case of Bangladesh exemplifies the complexity of these dynamics and highlights the challenge of establishing a clear cause-effect relationship as described. Addressing climate justice becomes even more difficult in contexts where legal and social systems perpetuate evident inequalities.

9 Climate justice and activism (Who is involved in climate justice?)

Adriana Recalde Martínez and Alexandra Cosima Budabin

Activism around climate justice is linked to the larger environmental movement that has existed for over a century. What links activities like activism, social movements, and protests is the notion of contentious collective action, which encompasses activities conducted by "people who lack regular access to institutions, who act in the name of new or unaccepted claims, and who behave in ways that fundamentally challenge others or authorities" (Tarrow, 1998, p. 3). Unlike lobbying or representative politics, activism is a way to "bring ordinary people into confrontation with opponents, elites, or authorities" (Tarrow, 1998, p. 4). This contentious collective action is a process of issue construction wherein "activists identify a problem, specify a cause, and propose a solution, all with an eye toward producing procedural, substantive, and normative change in their area of concern" (Keck & Sikkink, 1998, p. 8). As the basis for issue construction around climate justice, environmentalism can be considered a frame "within which the relations among a variety of claims about resource use, property, rights, and power may be reconfigured" (Keck & Sikkink, 1998, p. 121). Whereas environmental activism has a long history, the recent large-scale protests that have taken place point to an "evolution of concern over the impact of human action on ecosystems and the natural world" (Martiskainen et al., 2020).

Environmental activism actions include mobilizing and recruiting people, attracting media coverage, shaping social attitudes, and influencing policies and protest targets (Hall, 2023). With climate change, a lot of attention has been paid to addressing the persisting ignorance and misunderstanding of climate change and the various approaches needed to address it in order to build broader cooperation. Campaigns for climate justice may be organized at local, national, and international levels with protest targets ranging from states to corporations to international governmental organizations.

A recent turning point in the climate movement came in the wake of the perceived failure of the COP talks in Copenhagen in 2009 when there was a move away from climate change frames to those around climate justice. Compared to the moderate wing that is more accepting of capitalism and advocates within established climate institutional spheres, the so-called climate justice wing more forcefully promoted a solution to the climate crisis as being rooted in lifestyle-changes and the end of the capitalist economic system. This wing also bridges the climate justice frame with other human rights frames to strategically link with other movements and alliances (della Porta & Parks, 2014) and is more inclined to mobilize contentious collective action outside of climate institutions (Schapper et al., 2023, p. 403). Another effect of shifting to climate justice frames has been the ability to connect climate change to systemic challenges related to migration, gender, labour, and class and build coalitions with social, economic, and gender justice mobilizations (Hadden, 2014, p. 12).

Environmental activism has also incorporated intersectionality in thinking about vulnerabilities as well as in building coalitions and linking issues across ethnicity, class, and gender (Roth, 2021). Further, intersectionality has been helpful in understanding the heterogeneity of constituencies and leaderships as well as to what extent activism reflects this heterogeneity (Roth, 2021). Three examples of climate justice activism connected to gender and youth illustrate these intersectional perspectives on vulnerability, agenda and inclusion. Further, migrants who have moved for environmental reasons have also been seen more likely to mobilize (Koubi et al., 2021).

Gender identities and inclusive leadership have been regarded as salient for environmental justice movements though there remain barriers to assuming leadership roles (Bell & Braun, 2010; Taylor, 2015). One example of an activist network linking women's organizations is the Global Alliance for

Green and Gender Action (GAGGA[5]), which was founded in 2016. Through a financial and technical support, those women-led community-based groups join forces to strengthen the nexus of women's rights, gender, climate, and environmental justice at local, national, and regional levels and globally. The main work is related to fight against a power imbalance in which the female gender is delegitimised, oppressed and discriminated. The network also draws attention to the burden of patriarchal hierarchies in the Global South as well as the marginalization of women from the decision-making process, land ownership and in general, from social life. Additionally, according to distributive and recognition approaches of climate justice, GAGGA is working on combating vulnerabilities as well as recognizing the vital role of women in managing natural resources, preserving nature and develop sustainable and innovative just solutions, reaching an avoidance of the worst-case climate scenarios. These solidarity networks are weaving a hopeful and empowered future for many women around the world.

The past few years have seen the increased visibility and influence of youth activism on climate change in the forms of school strikes and marches. Following the lack of action on substantial measures between the COP of Paris (2015) and Madrid (2019) to reduce greenhouse emissions, a youth movement was born (Svampa, 2020). March 15th, 2019 saw an estimated 1.6 million students across the world engage in a school strike; this weekly commitment to addressing political inaction became a movement called Fridays for Future[6] (Schoemakers, 2020, p. 73). This youth engagement was seen to be fighting against the distrust of a set of veteran environmental organisations already established in the dynamics of climate activism (Reingold, 2019). The claims ranged from re-thinking the empty of content "sustainable development" concept, pooling ancestral knowledge with scientific data, to ensuring the right of future generations to enjoy a stable living standards no lower than the present generation one. However, there are concerns that youth engagement continues to face barriers related to their ability to negotiate in international spaces, Global North dominated mobilization practices, narrow focus on individual responsibility, youth-washing, and exclusionary narratives (Sloan Morgan et al., 2024). Making youth engagement meaningful and impact will require recognizing and elevating the position of youth in decision-making spaces and centre their perspectives.

Despite the movement's expansion and diversification, there are concerns about racism within climate justice activism (Grieveson, 2021) as well as increasing repression of environmental protest and civil disobedience (UNECE, 2024).

[5] GAGGA – Global Alliance for Green and Gender Action, https://gaggaalliance.org.

[6] Fridays For Future is an international climate movement active in most countries and our website offers information on who we are and what you can do.

10 Climate justice and other dimensions of justice

Federico Voltolini, Alexandra Tomaselli and Isidoro De Bortoli

Climate justice cannot be tackled as a standalone development around justice. In particular, it stems from the debate on environmental justice, that refers to the application of principles of justice in an analytical and normative way to the environment in which people live, works and play ("where we live, work, and play"; (Santana & Novotny, 2002, p. 1). The "proximity" between people and the environment is a key concept of environmental justice (McCauley & Heffron, 2018).

Historically, environmental justice is a concept that many scholars trace back in the 80s in USA following protests of several civil rights organisation (including the United Church of Christ – UCC) on the construction of a toxic waste landfill near a neighbourhood of African American people in Warren County, North Carolina (Mohai et al., 2009; Schlosberg, 2013; Timmons Roberts et al., 2018). As a result, the U.S. General Accounting Office started an investigation on the racial composition of the communities near four hazardous waste landfills in the South of the USA. The study highlighted that African American were disproportionately represented in all the four case studies and predominantly in one. The UCC then commissioned a study on the racial and socioeconomics composition of communities around hazardous waste sites across USA (Mohai et al., 2009). The report entitled Toxic Wastes and Race in United States (1987) showed a positive correlation between zip code areas and commercial hazardous waste facilities and area with high percentage of people of colour. Since these two preliminary studies the literature on the nexus between race, socioeconomics characteristics and environmental hazards has multiplied. The Environmental Protection Agency of the USA define Environmental Justice as "the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

While the academic concept of environmental justice stems from these episodes in USA, environmental justice movements originated also in other parts of the world. To give two examples, the labour movements against the despoiling of the Amazon rainforest in Brazil by Chico Mendes or the work of Alexander Langer for an "ecological conversion" of society. In Europe, environmental justice made his official debut with the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, also known as Aarhus Convention, signed in 1998. In its first article, the Convention states "in order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being" to "guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention."

Both the definitions, the EPA's one and the Aarhus's one, highlights a normative dimension and contains elements of distributive justice and procedural justice. Distributive justice in environmental justice meaning that different social groups should not suffer a disproportionate burden of negative environmental impacts, or vice versa everyone has the right to an adequate environment. While procedural justice concern that all communities should have access to information and mechanism to allow the participation in decision affecting environment (Laurent, 2011). At the same time, studies which applied an environmental justice analytical lens highlight the distributive and procedural principles of justice theory.

An interesting tool to be explored is the Global Environmental Justice Atlas[7]. It is an online interactive platform that documents and catalogues social conflicts related to environmental issues. Coordinated and managed by a team of researchers and activists, the platform features content and data contributed by hundreds of collaborators worldwide. These contributors share their own stories of resistance or document what they observe, providing a rich and diverse perspective on environmental struggles.

Energy justice refers to the application of tenants of justice in an analytical and normative way to the energy system – production, transmission, distribution, consumption and policies (Jenkins et al., 2016; McCauley & Heffron, 2018; Siciliano et al., 2018; Sovacool et al., 2019). The term "energy system" refers to processes, infrastructures and technologies involved in the production and consumption of energy. This includes various forms of energy such as electricity, thermal, mechanical and chemical. The global energy system accounts for approximately 75% of global CO2 emissions (Ritchie & Roser, 2020), primarily due to the sources used for energy production. Around 65% of energy is generated from fossil fuels—coal, oil, and gas—which are high-intensity sources of CO2 emissions. Consequently, a rapid transition to low-carbon energy sources, such as solar, hydropower, and wind—which currently constitute only 12% of global energy production—is urgently needed (Energy Institute, 2024). Alongside this need for an energy transition, there has been a concurrent rise in studies focusing on energy justice.

The study of energy justice is grounded in two main theoretical approaches (Lacey-Barnacle et al., 2020). The first is the framework of core tenants, which historically highlights the three tenants of justice: procedural justice, ensuring inclusive participation in energy-related decision-making; distributional justice, promoting a fair allocation of the benefits and burdens of energy systems, including the right to access energy; recognition justice, addressing issues of marginalization and social inequality. More recently, a fourth dimension—restorative justice—has been introduced (Heffron & McCauley, 2017; Siciliano et al., 2018). This additional principle emphasizes the importance of corrective actions to address and repair injustices in the energy sector, drawing inspiration from legal theories of criminal justice.

The second approach focuses on the practical application of energy justice principles to policymaking, in a normative way. It revolves around an eight-principle decision-making framework (Sovacool & Dworkin, 2015) that provides actionable guidelines for policymakers. This framework prioritizes factors such as energy availability, affordability, fairness in processes, transparency and accountability, environmental sustainability, and equity both within and across generations, as well as assigning responsibility for addressing these concerns.

An example of energy justice, specifically in terms of distributive justice is the unequal access to electricity worldwide. According to World Bank data, while 91.3% of the global population has access to electricity, significant disparities exist between the Global North and Global South, as well as between urban and rural areas. Globally, 97.6% of urban populations have electricity access, compared to only 83.9% in rural areas. In European countries, access is nearly universal at 100%, whereas in Sub – Saharian countries, an average of 55,1% of the population hace access to energy. For instance, in Niger, only 7.7% of the rural population has electricity, compared to 66.1% in urban areas, resulting in a national average of just 19.1% (World Bank, 2023).

A distinctive concept of social justice originates from the seminal work of Rawls (1971). According to him, justice concerns "the way in which the major social institutions distribute fundamental rights and duties and determine the division of advantages from social co-operation" (p. 7). McArthur (2016) points out that Rawls' approach is grounded in the utopian notion of a society where individuals are free, equal, and independent. Within this framework, differences among citizens, particularly in pursuing their unique interests, are harmonized within a context of mutuality. However, this idea is

[7] https://ejatlas.org/

somewhat illusory, as it tends to recognize individuality or difference only within a limited and agreed-upon set of characteristics.

Nussbaum (2006; 2011) and Sen (2007; 2010) have advanced the capabilities approach to social justice. Both scholars reject idealized models of social justice, focusing instead on the complexity and diverse nature of people's lived experiences. Central to this approach is the idea that justice is about an individual's ability to realize their potential within their specific social context. Nussbaum emphasizes that while theories of social justice should be "abstract," they must also be responsive to the world's most urgent problems and adaptable to change (Nussbaum, 2006, p. 1). She critiques overly idealized theories for failing to address pressing global issues. Similarly, Sen (2010) argues that an obsession with perfect justice distracts from addressing real and present experiences of suffering and injustice, asserting that "justice cannot be indifferent to the lives that people can actually live" (p. 18). Sen is particularly concerned with the choices involved in pursuing greater social justice within the constraints of an imperfect world with limited resources.

As reported by McArthur (2016), Fraser (2007; 2003) and Honneth (2003a, 2003b) advocate for revitalizing critical theory – a broad tradition of thought, beginning in the early twentieth century, that reexamines Marxist and other social theories in light of emerging social orders – in the context of the twenty-first century. On the one hand, Honneth focuses on the fundamental role of recognition (and its absence or denial) in achieving social justice. Fraser, on the other hand, proposes a dual approach to social justice that emphasizes both recognition and redistribution, aiming to reclaim the economic focus that she believes has been neglected in the shift away from the Marxist roots of critical theory. More recently, Fraser (2007) has introduced a third dimension to her conception of social justice: participation, which she argues highlights the political aspect of justice.

Lake (2018) has recently advocated for shifting from a substantive to a relational understanding of the "social" in social justice. This approach does not confine the social to a specific, bounded domain where justice is evaluated; instead, it views the social as "a mode of collective association through which justice is performed and produced" (p.337). By moving the concept of the social from a substantive sphere to a relational practice, the issue of social justice is reframed. Rather than evaluating the fairness of outcomes within a defined social sphere, this perspective focuses on the interactive practices of social actors engaged in a collective effort where justice is both a process and an outcome, a means and an end simultaneously. A relational and process-oriented approach acknowledges that power is unevenly distributed across structural positions, but also emphasizes that these structural relations must be enacted and performed. It is within the unpredictability of this praxis that a politics of possibility emerges (Lake, 2018). Therefore, Lake (2018) argues that advancing social justice should concentrate on everyday practices of associative interaction, where relations of democratic equality are either challenged or supported.

In this sense, climate justice, by originating from environmental justice, needs not only to embrace energy justice but also the iterative and relational approach of social justice, especially considering the unequal access to resources and the critical matrixes of social inequalities when different axes intersect.

11 Conclusions

Jessica Balest and Alexandra Tomaselli

Climate change, driven largely by human activities, presents not only environmental challenges but also significant justice concerns. These issues underscore the importance of equitable responses that recognize the uneven burdens and responsibilities faced by various communities. Vulnerability to climatic events varies widely among people and nations, influencing welfare outcomes in diverse ways. Assessing climate disadvantage requires evaluating the interplay between the likelihood and severity of hazard exposure and the vulnerability of individuals or groups to those hazards. However, the extent to which a person or community is affected by a climate event depends on their exposure and vulnerability, yet the intricate relationships between these factors make it difficult to establish clear cause-and-effect connections. Focusing exclusively on the probability and intensity of hazard exposure fails to capture the full scope of impact distribution. This complexity reinforces the need to address climate change through a justice-oriented perspective, ensuring that solutions account for these multifaceted dynamics.

In this frame, this report synthesized the current debate on climate justice concept, highlighting its roots in environmental justice movements and its role in addressing the impacts of global warming not only on vulnerable populations, but also on all populations and natural ecosystems. By integrating the multifaceted dimensions of justice and exploring its intersections with other and related concepts, this report has aimed to pursue the goal of advancing a justice perspective for researchers, activists, and policymakers, providing valuable insights to navigate the complexities of climate justice. Grounded in the concept of inequality, the conceptualization of climate justice is strictly connected to the need to address disparities in resource distribution, opportunities, and power and aims to empower individuals in responding to climate change. Achieving greater climate justice requires evolving our understanding of the mechanisms that sustain inequalities and identifying pathways for transformative change(s). This includes advocating for systemic shifts in societal structures and prioritizing the protection and restoration of natural ecosystems, moving beyond reliance on technical innovations or incremental policy adjustments. In this frame, this report aimed at bridging academia, activism, and policymaking through a climate justice lens, which interlinks with diverse concepts e.g., inequality, intersectionality, activism. This perspective aims to promote transformative approaches into research and policy design in diverse sectors, addressing both descriptive and normative goals.

A robust framework for climate justice incorporates four interconnected tenants: distributive, procedural, recognitional, and corrective justice. These pillars address the fair distribution of resources, risks, and opportunities (distributive justice) while promoting governance structures that enable transparent, accountable, and inclusive decision-making. They also ensure that all communities, particularly those marginalized, have a voice in shaping mitigation and adaptation policies that directly affect them (procedural justice). Recognizing population diversity is essential—not only to address the needs of the most vulnerable but also to consider the unique circumstances of individuals and communities. The report further underscores the need to safeguard the resilience of future generations, considering that climate justice must confront the inherently social and political dimensions of climate change, alongside its environmental implications.

Finally, in a juridical perspective, legal frameworks should ensure that those most responsible for emissions are held accountable through reparative actions while establishing systems that prevent future harm. This includes incorporating penalizing measures where necessary to deter violations and foster accountability (corrective justice). In this sense, climate justice, by originating from environmental justice, needs not only to embrace energy justice but also the iterative and relational approach of social

justice, especially considering the unequal access to resources and the critical matrixes of social inequalities when different axes intersect e.g., gender, ethnicity, age, disability, class.

This is where also activism comes into play. Historically, activism around climate justice is linked to the larger environmental movement that has existed for over a century. Rooted in the broader environmental movement, climate justice activism challenges existing power structures through contentious collective action. This form of activism involves individuals who lack regular institutional access, advocate for new or unrecognized claims, and act in ways that challenge others or authority figures at a fundamental level. Unlike lobbying or representative politics, activism serves as a mean to engage ordinary people in direct confrontation with opponents, elites, or authorities. A recent turning point has consisted in shifting the narrative from addressing climate change in isolation to advocating for climate justice, particularly following perceived shortcomings in global forums such as the COP 2009 talks in Copenhagen. Activists in the climate justice wing promote profound societal changes, including lifestyle shifts and critiques of the capitalist economic system. But they are not exempt from criticism either. A key example of actors and movements that advocates for profound changes, within climate justice itself, is ecofeminism, which proposes that true social justice requires challenging patriarchal power structures recognizing the value of qualities like nurturing and cooperation, and fostering a more holistic, interconnected worldview that respects both gender and nature.

Adding to this, scholars emphasize the importance of applying an intersectional lens to climate justice, addressing overlooked complexities in adaptation and mitigation efforts. Intersectionality, rooted in critical race theory, uncovers how intertwined social inequalities, like gender, ethnicity, and class, shape vulnerabilities. It aligns with climate justice to reveal and challenge systemic power imbalances, fostering inclusivity in decision-making and policies. Case studies, such as Barcelona's urban adaptation strategies and Arctic Indigenous women's experiences, highlight the necessity of localized, intersectional approaches. Gender, youth, migrants, and minority communities are key focuses, which, with many others (e.g., disability, class), can enhance the way solidarity, inclusivity, and effective climate interventions are shaped and applied. Furthermore, socio-ecological approaches provide valuable insights for fostering sustainable development that prioritizes social justice while respecting ecological boundaries. These frameworks critique the growth paradigm and advocate for degrowth, calling for a shift away from endless economic expansion toward more equitable and sustainable societal structures. By emphasizing the interdependence of social and ecological systems, these approaches underscore the importance of safeguarding environmental conditions as a foundation for achieving social and economic objectives.

This report has thus identified critical areas for future research for including and applying intersectionality to climate justice. It stresses the need for examining how intersecting inequalities contribute to injustices across the four principles of justice—distributive, procedural, recognitional, and corrective—beyond climate hazard studies. Further analysis is required to explore the practical implications of integrating climate justice into activism-oriented and transformative approaches that align with academic and policy perspectives. A comprehensive framework is needed to promote transformative policies, monitor progress, and incorporate climate justice into research and policymaking. This framework should move from climate justice sensitivity to responsiveness and transformation, ensuring justice informs ongoing transitions. Also, a more in-depth understanding on how to operationalize intersectionality and intersectional climate justice remains to be fully assessed and explored, although may initiatives are already in place in various regions and cities in the world (Recalde Martínez et al., Forthcoming).

Finally, since this report also clarifies distinctions and overlaps between climate justice and other justice frameworks like environmental, energy, and social justice. It is argued here that exploring these interconnections can provide clarity on potential pathways for transformative transitions—not only in technological innovation but also in reshaping social structures and enhancing processes for protecting and restoring natural ecosystems. This exploration could serve as a foundation for future dialogue, bridging academic, activism, and policymaking ideas and efforts to fairly drive and lead to actions that

take into due consideration the needs and the voices of those who are the most affected by both climate change and climate adaptation and mitigation actions, as well as by transitions processes.

In sum, climate research and policy cannot remain blind to the intrinsic diversity that characterises our societies and how it impacts the ways peoples and communities access services and processes, and it thus must integrate an intersectional climate justice approach that should be studied and tailored to different contexts and world areas.

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13 Annex 1

Overview of Climate (in)Justice

Climate justice is both a theoretical and practical framework for understanding and addressing climate change through a justice lens. It helps:

- Examine **responsibilities, impacts, risks, and responses** to climate change through a justice lens (descriptive goal)
- Develop **policies and actions** for mitigating and adapting to climate change, incorporating justice considerations (normative goal)

Four Main Tenants of (in)Justice

Distributive (in)Justice
Focus: Unequal distribution of climate impacts and responsibilities
Example: The Global South suffers the most from climate change, though it contributes the least to greenhouse gas emissions
Key question: How are risks and responsibilities distributed across people, regions, and generations? And how policies and actions could reduce these inequalities?

Procedural (in)Justice
Focus: Fairness in decision-making processes and the inclusion of marginalized voices
Example: Communities most affected by climate change, often minorities or low-income groups, are excluded from decision-making on climate policies
Key question: Who gets to participate in decisions, and how fair is the process? How can the process be fairer?

Recognition (in)Justice
Focus: Acknowledging and addressing the marginalization of specific social groups
Example: Indigenous groups and women are disproportionately impacted by climate change but often overlooked in policy solutions
Key question: Which groups are being recognized or ignored in climate actions and policies?

Corrective (or restorative) (in)justice
Focus: Accountability for damages and providing remedies for those harmed by climate change
Example: Holding polluters accountable for environmental damage and providing reparations to affected communities
Key question: Who is responsible for the harm, and how can it be repaired? Who should pay?

Relations with other concepts

Social Inequalities in Climate Justice

- Inequality refers to the **uneven distribution of resources** (economic, social, infrastructural) that tend to accumulate and create vulnerabilities in certain groups or regions
- Inequalities of **opportunities** (e.g., education, health)
- Inequalities of **condition** (e.g., wealth, access to resources)
- Inequality is linked to diverse climate justice topics:
- **Climate Change:** Vulnerable groups (e.g., elderly, ethnic minorities) face disproportionate risks, such as heatwaves due to lack of access to green spaces and cooling services
- Wealthier populations **consume more** air conditioning, contributing to climate problems

- **Linking with e.g., corrective justice:** Calls for reparations and compensation for those disproportionately affected by climate change—often the least responsible, such as low-emitting, vulnerable populations

Resilience in Climate Justice

- **Resilience:** Refers to the ability of systems (ecological, social, or technological) to adapt, reorganize, and withstand stress while maintaining core functions. Its main features are **adaptive capacity** – or the ability to adjust and reorganize and **dynamic & learning systems** – since resilience is continuous, evolving with challenges
- **Climate resilience**: Refers to strengthening systems (people, economies, environments) to withstand climate impacts
- UNFCCC's goals: **Resilient people** and livelihoods, Resilient **businesses** and economies, and Resilient **environmental systems**
- **Just resilience:** Ensures vulnerable communities are not left behind in adaptation efforts. Justice is emphasized in the IPCC's 6th Assessment Report and EU cohesion policies (EEA, 2024)
- **Linking** with e.g., recognition justice: Resilience should acknowledge different adaptive capacities and seek to "leave no one behind

Socio-Ecological Transformation in Climate Justice

- **Socio-ecological transformation**: Refers to deep and systemic changes to social, economic, and political systems, aimed at achieving sustainability, equity, and climate resilience
- **Connections to climate justice:** Both concepts:
    - Emphasize addressing structural inequalities and environmental challenges simultaneously
    - Focus on fair distribution of benefits and impacts, also considering marginalized communities
    - Aim for equitable and sustainable future by promoting inclusive decision-making
- **Example – Degrowth & feminism perspectives:** The degrowth approach advocates for a shift away from endless economic expansion, while feminist perspectives argue that prioritizing care and challenging structural gender inequalities provide pathways for radical change that respects ecological limits

Eco-Feminism and Gender Equality in Climate Justice

- Climate change **disproportionately impacts women**, especially in the Global South, as they are often the primary providers of food, water, and energy
- Ecofeminism is a **social and political movement** that explores the interconnected oppression of women and nature
- It argues that patriarchal structures that **exploit and dominate** women also fuel the degradation of nature
- Ecofeminism sees climate justice and feminism as interrelated, both addressing **systemic inequalities** and where women are seen as key agents of change in fighting for both ecological sustainability and social justice
- Ecofeminism supports a **shift** from power-based, hierarchical systems to more cooperative, egalitarian, and sustainable ways of living, **respecting women and nature**

Intersectionality in Climate Justice

- **Intersectionality:** Different sectors of the society are experiencing differently oppression and privilege, and it may be caused and exacerbated by social drivers such as age, gender, ethnicity
- **Connecting intersectionality to climate change**: On the impact of climate change in exacerbating existing inequalities that are already grounded in complexities in the lives of individuals located at multiple social intersections
- **Linking** with e.g., recognitional justice: Recognition of salient linkages of climate justice with the categories of youth, migrants, and minority communities, which can experience climate change differently

- **Example**: Barcelona's strategies (2015-2023) have pursued a keen awareness of the intersection between climate issues and societal dimensions, such as reducing socioeconomic disparities, respecting cultural traditions, and protecting community rights

Vulnerability in Climate Justice

- **Vulnerability** is the risk of harm from environmental and social stresses, with greater risks for those social groups lacking essential services. Vulnerability is context-specific and vary among types (economic, social, health, environmental)
- **Climate justice** aims to address the unequal distribution of climate risks and responsibilities
- Vulnerability plays a key role in **amplifying climate injustice**, as those least responsible for climate change are often the most affected
- Climate justice involves creating policies that protect vulnerable communities and **fairly distribute adaptation and mitigation efforts**
- **Example: Bangladesh's** vulnerability to **floods and cyclones** drives and loss of livelihoods, exacerbating **social issues** such as child marriages and highlighting the need for climate justice that would require addressing both the environmental factors and social inequalities that perpetuate these **cycles of vulnerability**

Activism in Climate Justice

- **Activism** involves *contentious collective action* by individuals or groups who lack regular access to institutions, challenging authorities or power structures to promote social, political, or environmental change
- **Climate justice activism** seeks to address the systemic inequalities driving climate change, often through protests, mobilizations, and coalition-building. It **connects** climate issues **to other social justice causes** like gender, labour, and migration
- **Intersectionality**: Activism now includes diverse voices, linking issues across class, gender, and ethnicity, focusing on inclusive leadership and decision-making
- Examples:
    - Gender and Climate: The **Global Alliance for Green and Gender Action** (GAGGA) supports women-led groups advocating for climate and gender justice
    - Youth Movements: **Fridays for Future** mobilizes youth globally to demand climate action, confronting political inaction

Other Typologies of Climate Justice

- **Environmental justice:** Refers to the application of tenants of justice in an analytical and normative way to the environment in which people live, works, and play
- **Social justice:** The historic evolution of the concept may permit us to write:
    - "Social justice refers to the fair distribution of rights, duties, and resources within society, ensuring individuals have the ability to realize their potential and participate equally in social, economic, and political life, while addressing inequalities through recognition, redistribution, and relational practices"
- **Energy justice:** Refers to the application of tenants of justice to energy systems, including production, transmission, distribution, consumption, and policies. It emphasizes that energy is valued as an essential resource, and the way we allocate the benefits and burdens of energy systems is a crucial issue for any society aiming to achieve fairness