

The Missing Link between Inequality and the Environment in SDG 10

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1. Introduction

The Sustainable Development Goals (SDGs) were first proposed as a way to remedy an inequity built into the structure of the Millennium Development Goals (MDGs). The MDGs asked developing countries to act, while high-income countries were to provide funding and leadership (Caballero 2019). Colombia, a developing country, put forward the original concept for the SDGs, a clear demonstration that leadership could come from outside the “developed” countries. A universal agenda was to be created, in which all countries would have the responsibility to act. This did not resolve all equity concerns; indeed, many G77 member countries objected on the grounds of another equity principle, that of “common but differentiated responsibilities” (Caballero 2019, p. 138), in that developing countries were now taking on duties that some developing countries viewed as the responsibility of the high-income countries. Negotiating through the thicket of powerful actors and contradictory agendas was an enormous task, capped by a marathon final session that ran 48 h past its planned ending (Kapto 2019).

The need to address inequality in the SDGs was reinforced in the terms of reference to the SDG High Level Panel of Eminent Persons convened by the UN Secretary General, who asked for “[r]ecommendations on how to build and sustain broad political consensus on an ambitious yet achievable Post-2015 development agenda around the three dimensions of economic growth, *social equality* and environmental sustainability” (UN Secretary General 2012, emphasis added). This mandate is reflected at a high level in the SDGs, with one goal, SDG 10, being to “[r]educe inequality within and among countries”. The separate specification of inequality within and among countries captures two divergent perspectives, evident in the SDG negotiations, on what aspects of inequality merited attention (Fukuda-Parr 2019). First, the problem of *vertical inequality*, captured by the phrase “extreme inequality” and reflecting concern over the concentration of wealth and power among national and global elites. Second, the problem of *horizontal inequality*, captured by the phrase “exclusion” and reflecting concern over access by vulnerable and marginalized communities.

The targets associated with SDG 10 are more aspirational than those for other SDGs and encompass a wide range of goals, from income growth and social protection to improved market regulation and migration policies, and more. SDG 10 does not necessarily advocate for a large-scale redistribution of wealth. Still, it encourages increased opportunities for prosperity by reducing discrimination and promoting equitable access to opportunities both at a global and individual level (Oestreich 2018); while making space for the disenfranchised can reduce inequality to a certain extent, without acknowledging the systemic processes and actions resulting in the inequalities in the first place, current disparities will persist (Oestreich 2018). Addressing systemic inequalities can support the distributive, non-discriminatory justice that SDG 10 ultimately strives to achieve (Basnett et al. 2019). We argue in this chapter that due to systemic relationships between development and environment, addressing systemic inequalities holds especially true for inequalities around environmental resources and impacts, which we collectively refer to as “environmental inequalities”.

1.1. The Relationship between SDG 10 and the Environment

Tackling inequalities is central to the achievement of SDGs other than the explicitly inequality-focused SDG 10. There are direct links between inequality and the environment. As a result, there are links between inequality and the SDGs that target environmental resources or impacts (Basnett et al. 2019). For example, the power held by wealthy nations led to extensive resource and land appropriation of developing countries. These inequalities brought forth the high levels of carbon dioxide emissions (SDG 13) and environmental degradation we see today (SDG 12) (Sealey-Huggins 2017), resulting in the exceedance of several planetary boundaries (SDGs 14 and 15) (Steffen et al. 2015). While climate impacts will affect everyone to some degree, poor and marginalized communities and low- and middle-income countries will bear disproportionately higher health risks (SDG 3), food, water, and energy insecurities (SDG 2, 6, 7), and threats to people’s livelihoods (SDG 1.5 and 5), therefore further deepening inequalities.

However, despite the assortment of inequalities described within SDG 10, none of the targets explicitly mention the environment—one of the three pillars of sustainability. The implication is that the environment is taken care of by meeting other SDG targets (Oestreich 2018). Without explicit mention of the environmental dimension of inequality, there is a risk that proposed environmental solutions will neglect the poor and other marginalized groups or the constraints faced by low- and middle-income countries, leading to further inequalities.

Short of transparent, quantifiable processes and indicators dedicated to reducing environmental inequalities, some communities may find themselves worse off despite overall environmental gains (Basnett et al. 2019). For these reasons, environmental inequalities pose a risk to achieving sustainable development goals (UNDP 2014).

Through increased awareness of the trade-offs and synergies of various environmental solutions and an understanding of institutional, economic, and political drivers of inequality, there is an opportunity to ensure that SDG-related activities address the links between the environment and the intersections with poverty, gender, race, and other issues (Basnett et al. 2019; Schleicher et al. 2018) and differential development challenges between countries (Kartha et al. 2012).

1.2. The Disputed Environmental Kuznets Curve

Before proceeding, we first acknowledge that many discussions on environmental inequality begin with the “environmental Kuznets curve” (EKC), which depicts a hypothetical relationship between environmental pollution and income per capita. First described by Grossman and Krueger (1991), the EKC suggests that environmental degradation is necessary for the initial stages of economic growth and that, ultimately, economic growth will fix ecological problems. While the EKC may apply to pollutants with immediate and fairly localized impacts such as sulfur dioxide, nitrogen oxide, and particulate matter, evidence for an EKC is weak at best for carbon emissions, waste generation, land degradation, and the decline of natural resources (Stern 2004).

In the case of carbon emissions, developed countries and high-income individuals are most responsible for climate change, mainly when consumption-based emissions¹ are considered (Kartha et al. 2020; Jorgenson et al. 2017; Chancel and Piketty 2015). Yet, climate damage affects developing countries to a much higher degree, particularly those living in small island developing states and the least developed countries (IPCC et al. 2018). This vulnerability is partly because of increased exposure to climate hazards in specific geographic locations, greater dependence on climate-sensitive sectors such as agriculture, and fewer resources to cope with and recover from negative climate impacts (Islam and Winkel 2017).

¹ Territorial-based emissions are directly generated by a country, whereas consumption-based emissions are embodied in goods and services.

Despite high levels of income per capita, developed countries do not appear to be lowering their emissions fast enough, if at all, to meet emissions targets. As a result, only a 5% chance exists of staying below a 2 °C increase in average global temperature based on current emission reduction trends (Liu and Raftery 2021). Furthermore, a study by Dorninger et al. (2020) showed that in 2015 alone, approximately 50% of resource consumption by developed countries came from the developing world. This leaves developing countries to not only adapt to climate change, but also manage the ecological impacts of resource use by the Global North.

Therefore, in addition to the lack of evidence, the EKC appears to be country-specific and does not address the inequalities within a country and the power dynamics between countries affecting environmental outcomes. These disparities are relevant for taking appropriate climate action and combating other environmental problems. To better understand these inequalities, the following sections will use popular frameworks for assessing the connections between inequality and the environment.

1.3. Frameworks for Analyzing Environmental Inequalities

Considerable research already exists on environmental inequalities, which have been systematized to a greater or lesser extent in frameworks or approaches. We consider three in this chapter. Research on *climate equity and justice* explores the inequalities between countries, and corresponding responsibilities, regarding GHG emissions while acknowledging a developing country's right to development (Fleurbaey et al. 2014; Kartha et al. 2012). Within a country, *environmental justice* scholarship highlights the disproportionate risks that minorities and poor communities face from environmental exposure (e.g., air, water, or soil pollution and degradation) and climate change (McGurty 1997; Mohai et al. 2009). Adding to these two frameworks are statistical studies on the *distributional* impacts of damage upon ecosystems and the natural environment, resulting in disproportionate harm to human wellbeing, depending on who has wealth and power (Boyce 2008; Holland et al. 2009). Taken as a whole, the frameworks cover both vertical and horizontal aspects of inequality while viewing inequalities from a systems perspective. The climate equity framework focuses squarely on vertical inequality, the concentration of power, and links between historical responsibility for emissions and income. The environmental justice framework, by contrast, puts most attention on horizontal inequality, listing specific vulnerable groups that tend to rely most closely on ecological services for their livelihoods and bear most of the consequences of environmental harm. The distributional framework offers the promise of looking

both vertically and horizontally in a unified critique. This chapter uses these frameworks for conducting an in-depth analysis of linkages between inequality and the environment.

2. Environmental Inequalities through a Climate Equity Framework

Not only do more unequal countries tend towards worse environmental outcomes (IPCC et al. 2018), both within and between countries, polluters who generate or drive the generation of waste and emissions are typically the least affected by it. The climate equity framework explores how inequality is a driver that systemically undermines climate action and contributes to climate disruption. We discuss here four mutually reinforcing mechanisms by which this happens, further discussed below:

1. Inequality leads to greater greenhouse gas emissions;
2. Inequality insulates the political and economic elite from the worst of climate impacts;
3. Inequality reinforces elite preference for a status quo hostile to climate action;
4. Inequality erodes social trust required for collective action.

2.1. Inequality Leads to Greater Greenhouse Gas Emissions

The wealthiest 1% of the world's population is responsible for twice the emissions of the poorest half. Their footprint is more than 100 times larger, matching their greater consumption, wealth, and political influence (Kartha et al. 2020). Compared to an equal world, this level of inequality implies a much larger global economy—and overall level of consumption and environmental impacts generally—to achieve a given level of economic wellbeing for the world's population of more than seven billion, many of which still lack basic energy services.

In the global context, this has meant that wealthy countries are responsible for depleting a disproportionate share of the global carbon budget and need to reduce their emissions to enable lower-income countries to meet their needs and achieve the SDGs while staying within the carbon budget. Without wealthy countries accepting responsibility for their emissions and providing significant support, poorer countries face the choice between rapid and disruptive decarbonization on the one hand and worsening impacts from disruptive climate change on the other.

2.2. Inequality Insulates the Powerful from Climate Impacts

Those countries and classes with the most political and social power are not the same ones as those experiencing the worst harms from climate change. Climate change may appear as a future problem to some people, but for many, it is a problem now (Steynor et al. 2020; Jones et al. 2017). This inevitably undermines climate action. Extremes of inequality can enable powerful countries and national elites to insulate themselves from the negative consequences of their decisions, even as they plague the majority (Notre Dame Global Adaptation Initiative 2021; Otto et al. 2019). This insulation eliminates, or significantly reduces, the economic and social costs of climate disruption and reduces the cognitive and political salience of climate change as a pressing concern, thus delaying action.

2.3. Inequality Enables Those Who Benefit from Investments in Fossil Fuels to Preserve the Status Quo

Those who benefit directly from fossil fuel extraction have actively worked to prevent or delay climate action. These are often the largest and most powerful corporations and the wealthiest and most politically active individuals. Their efforts can occur in a variety of forms, from establishing think tanks to wage misinformation campaigns towards the public (Supran and Oreskes 2017), to lobbying policymakers to prevent or weaken climate policy in order to impede climate action (Brulle 2018), or shaping legal and regulatory systems to maintain disproportionate power over policy directions (Gear 2014).

2.4. Inequality Erodes Social Trust

Numerous studies have demonstrated the centrality of rules that provide some bounds to inequity and foster social trust for successful navigation of small-scale commons challenges (Ostrom 2000). Some level of fairness is widely understood as an essential component of a politically feasible domestic policy (Huber et al. 2020). Internationally, there has been widespread recognition that countries will not commit to an agreement they do not perceive as 'fair enough' (Winkler et al. 2017; Young 2013). At all scales of action, attention to inequality is a political necessity to achieving environmental sustainability.

SDG 10's exclusive focus on economic outcomes and representation fails to acknowledge the underlying social structures and power balance between countries that weaken global climate action. While there are obvious inequalities between the elite and poor on an international scale, there are similar observations that can be seen within a country, as described in the following section.

3. Environmental Inequalities through an Environmental Justice Framework

Inspired by the Civil Rights movement, the environmental justice movement emerged in the 1980s following protests against a new landfill in Warren County, North Carolina, US when it was revealed that racism against poor, African American residents played a role in deciding the landfill's location (McGurty 1997). From then on, several studies found that poor, minority, and disenfranchised communities face heightened risk from contaminated air, water, soil, and climate change not only due to circumstance but due to politics and the political power of the elite and other dominant groups (Mohai et al. 2009). Here, using an environmental justice framework, we provide examples of how environmental risks may present themselves in different individuals and groups and also examine how these inequalities arise in the first place. This leads to the following observations:

1. Inequalities lead to disproportionate levels of environmental risk for vulnerable groups;
2. Inequalities arise for economic, political, historical, and social/cultural reasons;
3. An environmental justice framework can inform action on the SDGs.

3.1. Inequalities Lead to Disproportionate Levels of Environmental Risk by Vulnerable Groups

High concentrations of emissions from toxic pollutants and greenhouse gases can have a wide range of effects upon atmospheric, terrestrial, and aquatic ecosystems as well as temperature and rainfall patterns. While everyone will face the consequences of these environmental issues to some degree, the characteristics of a person, household, community, or social group often dictate the susceptibility to the risk of exposure. Those most vulnerable to disproportionate levels of environmental risk tend to include:

- Infants and Children;
- Elderly;
- Individuals with disabilities;
- Institutionalized individuals;
- Low-income households;
- Immigrants;
- Refugees;
- Ethnic minorities;
- Women;
- Rural households;
- Indigenous communities;
- Future generations.

Other circumstances that may be perceived as a disadvantage include lack of land ownership, geographic isolation, literacy rate, occupation, or level of political influence.

Physiological features, such as age, increase sensitivity to specific environmental impacts. Infants, children, and the elderly have lower immunity levels and are more at risk from exposure to harmful pollutants. For example, high levels of sulfur dioxide emissions from fossil fuels and industrial facilities lead to higher rates of lung disease and respiratory problems in children and the elderly (Chen et al. 2007). Exposure to heavy metals, such as lead, in water, soils, and other surfaces in small concentrations can have developmental effects on newborns and young children (Manisalidis et al. 2020). In general, pollution is linked to poorer academic performance in children (Mohai et al. 2011).

Extreme weather events are occurring with greater frequency and intensity due to climate change. Heatwaves cause higher levels of mortality in the elderly (Kovats and Hajat 2008). Hurricanes or typhoons present additional challenges for individuals with limited mobility when evacuations are necessary, such as the elderly, disabled, or institutionalized (e.g., those in prison, nursing homes, substance abuse facilities, etc.). Supplementary resources and specialized emergency preparedness plans are needed for individuals in these situations to avoid being left behind and left to cope with the mental and physical health effects stemming from neglect (Benevolenza and DeRigne 2019).

The physical and mental health burdens from pollution and climate change impacts also have cost burdens. Low-income households do not have the financial resources to adapt to climate change and shoulder higher costs from health care expenses, climate damage, or increasing energy requirements, including air conditioning for heatwaves or space heating for extremely cold temperatures. Poorer households also face higher levels of exposure from environmental or climate threats as they are more likely to live near high-risk areas, such as industries, power plants, highways, or floodplains (Mohai et al. 2009). Immigrants, refugees, and ethnic minorities often face structural racism and discrimination resulting in similar concerns, including a lack of access to the resources needed to adapt.

The economic and cultural livelihoods of rural households and Indigenous communities that rely on nature are significantly impacted by ecological and climate changes, as well as poorly managed environmental and forest protection initiatives. Castañeda et al. (2018) found that over 75% of working adults living in extreme rural

poverty² engage in agriculture for a living. However, climate-change-driven extreme events (i.e., drought, floods), changes to rainfall patterns as well as increasing levels of pests and diseases threatens agricultural production and have the potential to push more than 100 million rural families into deeper levels of poverty (FAO et al. 2018).

For Indigenous peoples, many of the environmental challenges faced today are tied to colonialism. It was through colonialism that many Indigenous peoples had their wealth, land, and resources taken away. Not only did colonialism and the appropriation of their resources lead to industrialization and a rise in carbon emissions, but it also leaves former colonies more exposed to climate change impacts (Sealey-Huggins 2017). Colonial legacies continue to exist today through globalization, capitalism, and imperialism (Schulz 2017). For example, many Indigenous communities continue to face the exploitation of natural resources and the abuse of land rights by energy and mining companies, including renewable energy projects (Temper et al. 2020). Furthermore, there is evidence of global NGOs and governments forcing Indigenous people to leave their lands to create conservation areas (Domínguez and Luoma 2020). These decisions have led to as many as 25 people being killed per year for defending their land and protecting their livelihoods (Butt et al. 2019). Therefore, for climate and environmental action to be effective, they must include decolonization and respect for land rights.

There are many ways that the various marginalized groups may overlap or intersect, exacerbating the inequitable outcomes that some individuals might experience from climate change (Kaijser and Kronsell 2014). For example, gender issues often intersect with the challenges described above. Women tend to be more dependent on common property resources and more vulnerable to the impacts of natural resource degradation than men (Foa 2009). Moreover, women are more likely to live in poverty, so many health, cost, and livelihood burdens have significant gender implications (Oxfam International 2020). Globally, women spend three times more time on unpaid labor (i.e., cooking, cleaning, childcare) (OECD 2018), so in households that use dirty cooking fuels like wood, dung, crop wastes, charcoal, or kerosene, women are twice as likely to get chronic obstructive pulmonary disease from indoor air pollution compared to women using clean cooking fuels (WHO 2018). Issues related to reproductive justice also often overlap with environmental justice. Pollutant emissions from toxic facilities near residential neighborhoods leads to serious reproductive and health hazards including breast cancer, birth defects,

² Using the World Bank definition of extreme poverty as those living on less than USD 1.90 per day.

spontaneous abortions, and infertility. The inability to control one's reproduction (lack of access to birth control and support to flee abusive relationships) further increases the risk of poverty. Furthermore, pregnant women have lower immunity levels and are more sensitive to air and water pollution (Manisalidis et al. 2020). There are also concerns about the accumulation of toxic chemicals in body fat being passed through breast milk to infants. Environmental protection and green policies can help improve gender equality, with many economic and social co-benefits.

There are also obvious intergenerational impacts of climate change. Future generations will bear the highest cost of climate inaction. Political leaders tend to delay strong climate governance as they believe there is a political trade-off between ensuring short-term economic gains against long-term sustainability. Instead of enacting rigorous policies to reduce emissions, the scale of action has mainly been at the household level, where individuals are choosing to reduce their carbon footprints with plant-based diets, low-emission transport, household energy efficiency initiatives, and more. These individual choices are not nearly enough compared to the system-level changes needed to limit climate change. As a result, there are indications that many young people are experiencing climate anxiety due to profound uncertainty over their future (Wu et al. 2020). Youth-initiated climate movements are gaining traction worldwide and are demanding policymakers to take action now (Lawson et al. 2018).

3.2. Inequalities Arise for Economic, Political, Historical, and Social/Cultural Reasons

Above, we provide examples of how environmental impacts on different groups lead to livelihood, wellbeing, health and cost burdens, and their potential to cause civil unrest and migration. As summarized by Mohai et al. (2009), the reasons behind these environmental inequalities vary but typically stem from economic motives, power imbalances, historical legacies, or simply discrimination, as described below. Once environmental inequalities are in existence due to any of the reasons listed above, they are reinforced through the emulation of existing organizational models or social/cultural traditions or the continued lack of resources, capacity, and power to take action (Tilly 1999).

Over time, economic needs are repeatedly prioritized over the needs of communities. For economic benefit, dirty industrial or waste facilities are sited in areas where land is inexpensive, which also happen to be where low-income families and other marginalized groups most likely reside. These facilities may drive people away (at least those who can afford to leave) and lower property costs, bringing more low-income people and attracting more industrial facilities. Not

only does economics play into the siting of facilities, but economic growth also depends on natural resources. When natural resources are scarce and only available on Indigenous lands, resource needs may be chosen over the needs of Indigenous communities leading to conflict (Mohai et al. 2009).

Instead of finding synergistic solutions that meet economic demands and prevent environmental degradation, the two factors are posed as “trade-offs”, where one can only thrive at the expense of the other (McGurty 1997). Policymakers can enact environmental regulations to reduce trade-offs, but rather than realizing the societal benefits of pollution control and clean-up, environmental regulations are often seen as regressive, thus disproportionately harming vulnerable groups (McGurty 1997).

In general, policymakers and even mainstream environmentalists in traditional environmental organizations perpetuate inequities through the limited involvement of minorities in leadership positions and environmental decision-making processes (McGurty 1997; Green 2.0 2021). Based on a cross-sectional analysis of environmental policies and power distributions across the US, Boyce et al. (1999) found that inequalities in power led to weaker environmental policies. This often occurs because decision makers face less risk themselves and instead risk vulnerable communities that are unable to defend themselves due to a lack of financial resources and political clout (in contrast with mainstream environmentalists with money, capacity, and political connections) (Boyce et al. 1999).

There are also historical reasons for inequities. For example, in the US, industrial zoning and urban planning practices are influenced by racial segregation policies. These legacies continue to impact the placing of industrial sites in Black communities (Mohai et al. 2009). There are also historical inequities related to colonization. Many Indigenous communities had to relocate to undesirable locations that have been found to be very susceptible to climate impacts (Parker et al. 2006).

In some cases, there is evidence of blatant discrimination towards certain races, ethnic groups, social classes, castes, or other minorities, related to the positioning of toxic sites or industrial facilities, or lack of consideration in the planning of natural resource use, environmental solutions, and resiliency plans. In these situations, present-day racism (or classism, casteism, etc.) may present itself as “environmental racism” (Holifield 2001). One example of this type of discrimination is against “Dalits”, lower-caste or oppressed individuals in Indian society. Dalits are considered untouchable, and many believe they “contaminate” the things they touch. For this reason, they are often discriminated against utilizing common resources, particularly

water sources, for fear from higher-caste individuals that their touch will contaminate the water body (Dutta et al. 2015).

3.3. An Environmental Justice Framework Can Inform Action on the SDGs

Based on the various environmental injustices identified above and the sources of those injustices, it is clear that SDG 10 does not explicitly cover these types of environmental inequalities or provide mechanisms to address them. The Principles of Environmental Justice³ offer solutions for how environmental inequalities could be mitigated. The main themes identified in the Principles include minimizing exposure to toxic pollutants or climate damage, recognizing land ownership rights, enabling self-determination of land and resource use, ensuring representation, active participation, and an equal voice early on in decision-making processes, and providing a legal avenue for seeking justice (without the need for an extensive amount of resources).

Many SDG targets touch on these themes, though not exclusively in relation to the environment or specific groups. For instance, SDG targets 1.4 (poverty) and 5.a (gender) advocate for “equal rights to economic resources” including “ownership and control over land and other forms of property, inheritance, natural resources”. Several SDG targets seek to minimize exposure, such as SDG target 1.5 (poverty) which aims to “build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events” or SDG target 3.9 (health) which strives to “substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination”; while some SDG targets refer to certain vulnerable groups, such as women, children, or low-income households, SDG target 13.b on climate-change planning is the only target to focus on “marginalized communities”.

Typically, projects, plans, and policies apply to all individuals within a society. Distributional assessments of projects, plans, and policies can highlight specific concerns for each societal group. This is not a typical practice. Potential impacts are often assessed separately, for example, through a health audit, gender impact assessment, livelihood assessment, and so forth. Instead of taking a piecemeal approach, systematic methods are needed to assess vulnerabilities together (Walker

³ “Delegates to the First National People of Color Environmental Leadership Summit held on 24–27 October 1991, in Washington DC, drafted and adopted 17 principles of Environmental Justice. Since then, The Principles have served as a defining document for the movement for environmental justice.” (see <https://www.ejnet.org/ej/principles.html> accessed on 1 November 2020).

2010). A more detailed analysis of distributional impacts and assessments is given in the next section using climate change planning as an example.

4. Environmental Inequalities through Analysis of Distributional Impacts

As we have seen from the preceding discussion on climate equity, developing countries are more vulnerable to climate damage compared to developed countries. Similarly, from our review of environmental justice studies, we show that the global high-income “polluter elite” (Kenner 2020) who are most responsible for pollutants and carbon emissions (Kartha et al. 2018) do not bear the brunt of the health risks associated with pollution. However, even attempts to remediate environmental harm can disproportionately impact poor and vulnerable communities (Büchs et al. 2011; Kemp-Benedict and Kartha 2019; Muttitt and Kartha 2020). Green taxes and environmental permits, for instance, are routinely regressive (Ekins and Dresner 2004; Serret and Johnstone 2006).

Reducing environmental impacts is only one aspect of transitioning to a cleaner environment. To ensure a just and equitable sustainability transition, we need to ensure that the poor and vulnerable are not left behind and that the transition does not exacerbate income inequality or the suffering of marginalized populations. We use studies of distributional impacts to assess how in the absence of conscious planning, interventions to reduce the effects of climate change can often worsen international and intranational inequities. That brief investigation suggests the following:

1. Both climate damage and solutions have distributional impacts;
2. Effective policies must include explicit equity-related targets.

4.1. Both Climate Damage and Solutions Have Distributional Impacts

Climate damage and the solutions proposed to address it are likely to have distributional impacts across populations depending on a variety of factors such as proximity to the changes, ability to access the benefits, historical spending patterns, physiological difference between individuals, cultural differences between communities, etc. Given that it is usually impossible to distribute the costs of climate damage proportionally (based on who is most responsible for the damages), the question then is what kind of climate-based decisions and solutions would be seen as equitable?

Serret and Johnstone (2006) assess what an equitable outcome of climate policy would look like. They define it as an outcome that produces “equal exposure to environmental harm or equal per capita benefit of environmental benefits” (ibid.) when measured across income groups. However, this definition of environmental

equity addresses only distributional environmental impacts across income. Income is only one of the many vectors along which there is an unequal distribution of power. Inequitable distributions of power are often present between different ethnicities, genders, castes, and geographies, to name a few.

When considering equity across so broad a distribution of populations, the definition of “harm” and “benefit” are not homogenous and are often tied to who has the political power to determine what counts as a “harm” and “benefit”. Those who bear the costs of climate policies are often the least involved in the decision making that results in these policies. Moreover, the different forms of inequality often reinforce each other; health inequalities can lead to educational inequalities, leading to wealth inequalities (Markkanen and Anger-Kraavi 2019). From a policy perspective, equitable policies are those that recognize these multi-layered inequalities and seek to remedy them; that is, policies that explicitly account for and cater to the needs of vulnerable groups. However, as Markkanen and Anger-Kraavi (2019) point out, there is no globally recognized definition of vulnerable populations. They, therefore, suggest looking at equity from an outcomes perspective. That is, equitable policies result in an equitable distribution of the costs and benefits of the policy between different social groups and countries.

4.2. Effective Climate Policies Must Include Explicit Equity-Related Targets

In their review of intranational climate policy outcomes, Markkanen and Anger-Kraavi (2019) point out that climate policies that explicitly target improving the health of vulnerable populations (such as policies to improve fuel emissions from public transport) have the most equitable outcome. However, in the absence of conscious planning, other climate change policies can have very inequitable health impacts. For instance, while large hydropower dams can help countries meet providing reliable, sustainable, and modern energy, they also often result in the relocation and resettlement of vulnerable populations. There is literature to suggest that in some countries where discrimination against ethnic or indigenous groups is institutionalized, these dams are routinely located in areas where these groups are concentrated (for example, Aiken and Leigh 2015). This discrimination and lack of sufficient compensation for these groups can result in mental and physiological health problems resulting from community breakdown. Without well-designed, equitable, and enforced benefit-sharing agreements between parties, environmental gains for some can lead to others being worse off (Schapper and Urban 2019).

Similarly, climate mitigation policies that implement green taxes, while beneficial for reducing overconsumption, can result in an increase in the cost of

energy-intensive goods and services (such as food and transport). The impacts of these price increases are felt more by the most impoverished populations. Transitions to renewable energy (in the absence of conscious re-skilling and re-employment) can result in loss of livelihood, especially in energy-exporting countries. If marginalized groups—women, low-income households, etc.—are excluded from new renewable energy projects, then the outcomes are likely to be inequitable. This restriction in participation can arise from high upfront costs or expensive educational requirements. These kinds of restrictions have been reported in forest protection initiatives, renewable energy projects, and biofuel production. However, if renewable energy projects are strategically situated in areas with low employment, they can help reduce economic inequalities.

Climate mitigation policies can also result in ethnic or gender inequality. Forest conservation projects that do not acknowledge communal land rights or energy policies that do not actively seek out women's participation are inequitable. However, allowing smaller communities access to energy by setting up small-scale biofuel production in the community can decrease energy inequality between communities.

Markkanen and Anger-Kraavi (2019) conclude that the climate policies that are the least inequitable in their outcome are the ones that explicitly seek to be inclusionary in their design and implementation and that take a pro-poor approach. Consulting with all groups present in local communities, using a local workforce, reallocating funds towards the development of lower-income communities, choosing solutions that would maximize the benefits for marginalized communities, along with putting in place adequate government support to assist those impacted by climate policies, are all ways in which intranational climate policy can be made more equitable.

5. Conclusions

Both the environmental justice and climate equity frameworks point to systemic, reinforcing mechanisms that link inequality to environmental impacts. The climate equity framework demonstrates the connection between vertical inequality and greenhouse gas emissions. This inequality insulates elites from the worst climate impacts, while climate action threatens those elites' wealth, making them averse to climate action. On the other hand, the environmental justice framework shows how horizontal inequalities disproportionately expose certain marginalized groups to environmental risks, many of whom lack the financial resources or political capacity to advocate for stronger environmental policies.

SDG 10, the goal that is specific to reducing inequalities, does not explicitly connect environmental concerns to inequality. However, environmental inequalities impact several SDGs, as summarized in Table 1. There are also interactions between SDGs that can affect one another. The implication we draw from this chapter is that whether interactions from other SDGs onto SDG 10 is negative or positive depends crucially on how sustainability solutions are designed and implemented. For example, when seen through a distributional lens, in the absence of conscious planning, solutions to accomplish SDG 3 (good health and wellbeing), SDG 7 (affordable and clean energy), SDG 8 (decent work and economic growth), and SDG 13 (climate action) may have a regressive impact on the targets of SDG 1 (no poverty), SDG 5 (gender equality) and SDG 10 (reduced inequalities) depending on the way solutions are executed. Systematic approaches to analyzing SDG interactions exist (for example, Pradhan et al. 2017; Nilsson et al. 2016) and can illuminate the relationship between various SDGs and the cascading nature of environmental inequalities.

Table 1. Examples of how environmental inequalities may impede select SDGs.

SDG		Examples of Environmental Inequality
SDG 1: No poverty		Poor, minority, and disenfranchised communities face heightened risk from contaminated air, water, soil, and climate threats. This complicates poverty reduction initiatives, as additional finances need to be directed towards reducing vulnerabilities to pollution and climate change, while ensuring that basic needs are met in a sustainable manner.
SDG 2: Zero hunger		Climate-change-driven extreme events (i.e., drought, floods), changes to rainfall and temperature patterns and increasing levels of pests and diseases threaten agricultural production. This affects food prices and food security, especially for the poor, and may push more than 100 million rural families into deeper levels of poverty.
SDG 3: Good health and wellbeing		Poor and marginalized people bear disproportionately higher health risks from environmental inequalities. This includes risk from exposure to harmful pollutants due to the siting of toxic facilities near low-income neighborhoods, air pollution-related respiratory illness from the combustion of dirty fuels for transport, cooking, or heating, mental health concerns related to climate anxiety and more. These health issues can translate into livelihood concerns and added cost burdens.
SDG 4: Quality education		Pollution is linked to poorer academic performance (Mohai et al. 2011). Climate change-related extreme weather events and rise in vector-borne diseases may impair a child's ability to attend school.
SDG 5: Gender equality		Women spend more time on unpaid labor (i.e., cooking, cleaning, childcare), therefore in households that use dirty cooking fuels, women are twice as likely to get chronic obstructive pulmonary disease from indoor air pollution. Girls are more likely to be removed from school to help family during hardships, such as agricultural production challenges due to climate change. Issues related to reproductive justice often overlap with environmental justice. For example, pollutant emissions from toxic facilities near residential neighborhoods leads to serious health and reproductive hazards including breast cancer, birth defects, spontaneous abortions, and infertility.

Table 1. *Cont.*

SDG	Examples of Environmental Inequality
SDG 7: Affordable and clean energy	<p>Low-income households do not have the financial resources to adapt to climate change and shoulder higher costs increasing energy requirements due to climate change, including air conditioning for heatwaves or space heating for extremely cold temperatures. Inhabitants of households that use dirty cooking fuels such as wood, dung, crop wastes, charcoal, or kerosene, are more likely to get chronic obstructive pulmonary disease from indoor air pollution compared to those using clean cooking fuels. Many Indigenous communities continue to face the exploitation of natural resources and the abuse of land rights by energy and mining companies, including for renewable energy projects; while large hydropower dams can help countries meet providing reliable, sustainable, and modern energy, they also often result in the relocation and resettlement of vulnerable populations.</p>
SDG 8: Economic growth	<p>For economic benefit, dirty industrial or waste facilities are sited in areas where land is inexpensive, which also happen to be where low-income families and other marginalized groups most likely reside. Not only do economics play into the siting of facilities, but economic growth also depends on natural resources. When natural resources are scarce and only available on Indigenous lands, resource needs may be chosen over the needs of Indigenous communities leading to conflict. Instead of finding synergistic solutions that meet economic demands and prevent environmental degradation, the two factors are often posed as “trade-offs”, where one can only thrive at the expense of the other.</p>
SDG 10: Reduced inequalities	<p>The systemic relationships between development and environment, especially on inequalities related to environmental resources and impacts (or “environmental inequalities”), need to be addressed to achieve the distributive, non-discriminatory justice that SDG 10 strives for.</p>
SDG 12: Responsible consumption and production	<p>A study by Dorninger et al. (2020) showed that between 1990 and 2015, large portions of materials, energy, land, and labor were taken from developing countries to produce goods and services for high-income countries. This leaves developing countries to manage the ecological impacts of resource use by the Global North, and less resources to meet their own needs.</p>
SDG 14: Life below water	<p>SDG 15: Life on land</p>

Table 1. Cont.

SDG	Examples of Environmental Inequality
SDG 13: Climate action	Wealthy countries/individuals are responsible for depleting a large share of the global carbon budget and are not lowering their emissions fast enough. The resulting climate change affects developing countries and marginalized communities to a much higher degree. Extreme weather events present challenges for individuals with limited mobility when evacuations are necessary. Powerful countries and national elites can insulate themselves from the negative effects of climate change and delay taking climate action.
SDG 16: Peace, justice and strong institutions	Indigenous communities continue to face the exploitation of natural resources and the abuse of land rights. In general, as many as 25 people killed per year for defending their land rights and livelihoods.
SDG 17: Partnerships for the goals	Wealthy countries need to accept their responsibility for their role in rising carbon emissions and the resource extraction and related ecological damage in developing countries. This involves providing financial resources, technological assistance, and other forms of support, to poorer countries to address environmental issues. It is also important to recognize the underlying social structures and power balance between countries and within a country that weakens environmental and climate action. There is overrepresentation of the elite and underrepresentation of the marginalized in decision-making processes. Developing countries and marginalized groups need to be better represented in environmental policymaking and be given leadership roles within international and national governance institutions to ensure financial and other resources are allocated to where they are needed most.

Inequalities arise for a variety of historically contingent reasons, and once in place, they tend to erode social trust, which is a prerequisite for collective action. Furthermore, there is evidence that inequalities are increasing across the world (for example, Piketty 2020). More is needed to raise awareness on the future implications of increasing inequalities and the impacts on the environment, and to ensure that SDGs do not further those environmental inequalities. Effective solutions that address the SDGs will require targeted attention to inequalities and an appreciation of the underlying, systemic processes that reinforce and perpetuate them. To develop these solutions, an inclusive decision-making process must be used whereby lower-income countries and typically marginalized populations are well represented. Systematic assessments of distributional impacts of potential solutions and policies can identify issues and potential vulnerabilities, and can assist in developing context-specific solutions that minimize inequality and maximize societal benefits. Given the greater awareness around environmental inequalities and their impact on the SDGs, and the development of processes to address them, there is greater likelihood that the goals and targets set out to be achieved can be met.

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