Who Bears the Cost? An Adaptation Framework for Climate Justice in the UK

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Introduction

The latest report from the IPCC (2023) highlights that human-induced climate change has had pervasive and egregious impacts on people, ecosystems and infrastructure over the past decades. Projections for the UK find that average temperatures are likely to rise, with increases in winter rainfall, flooding and rising sea levels (Defra, 2023). Crucially, the IPCC also emphasises that the most vulnerable populations are disproportionately affected by climate change, while contributing significantly less to it. These groups are often older, poorer, and therefore less able to adapt to climate change (Pardy et al. 2024, Preston et al., 2014). Evidence also highlights that climate change is likely to increase levels of inequality via the unevenly distributed costs of adaptation and mitigation (Chancel et al., 2025). Awareness about the distributional effects of climate change and policy is therefore crucial, as it remains the only way to achieve resilience in manner that is both socially just and effective. With this in mind, this article aims to offer some recommendations to achieve climate resilience for the years to come in the UK. In particular, it is argued that tackling climate inequality requires a community-driven, sustainable welfare approach which includes vast public funding of climate resilient infrastructure.

Setting the Scene for Climate Justice

Climate Change Impacts

In February 2026, record levels of rain caused flooding across parts of France, submerging houses, motorways and even roads in Paris, with an estimated cost of €3bn (RFI, 2026; BFM Business, 2026). Despite often being portrayed as one-off occurrences by media, extreme weather events are a direct consequence of global warming (IPCC 2023, chap. 11). Not only is flooding induced by anthropic climate change, but its effects are exacerbated the artificialisation of soil, which significantly reduces the ground's capacity for water absorption (Saco et al., 2021). The UK is also prone to flooding, with extreme rainfall events projected to quadruple by 2080 compared to the 1980s (Kendon et al., 2023). The annual economic cost due to damage

of infrastructure and property was estimated at £2.4bn. These costs are expected to rise to £3.6bn by 2050 and compound over time, with each year of flooding estimated to produce a downward pressure on the British economy worth at least £6.1bn in the following decade (Norman et al., 2025).

Inadequate Policy Response

Clearly, these effects cannot be taken lightly, and climate resilience has increasingly entered the purview of public policy. Key frameworks include the National Adaptation Programme (NAP3), which sets out the roadmap for climate adaptation in the UK. Within this framework, the Local Nature Recovery Strategies (LNRS) aim to account for local hazards, and Environmental Land Management Schemes (ELMs) include funds to promote sustainable farming practices and mitigate flood risks. The UK government has also committed a record £5.2Bn for flood and coastal erosion protection until 2036 (Defra, 2023). Reports on the value of such investments are unequivocal: Investing in climate adaptation now can significantly reduce the financial burden of future climate-related events. Studies show that early intervention can yield benefit-cost ratios of between 2:1 and 10:1, meaning that for every £1 spent on adaptation measures today, the resulting economic benefits could be worth anywhere from £2 to £10 (Defra 2023, p. 15; Watkis et al., 2021).

Nevertheless, important criticisms remain. The Climate Change Committee (CCC) has suggested that this framework has consistently struggled to make adaptation a key priority for policy development in numerous government departments, concluding that 'the UK's preparations for climate change are inadequate' (CCC 2025, p. 72). A related but less frequently discussed criticism concerns the NAP's distributive effects. Research has suggested that its sector-based approach fails to adequately account for the social dimensions of risk, obscuring how vulnerability varies across different populations and social contexts (Benzie, 2012). An example of this is provided by Preston et al. (2014), who suggest that the Environmental Agency's flood warning procedures respond to immediate damages rather than assessing its long-term consequences or the needs of vulnerable populations. More generally, it has been argued that climate adaptation policies often overlook the question of climate inequality. This matters, not only for questions of normative appeal, but also because it affects the efficiency of adaption policies (Preston et al., 2014).

Climate Change and Vulnerability

Introducing Climate Inequality

The IPCC report (2023) highlights that the most vulnerable populations are disproportionately affected by climate change, while contributing significantly less to it. Climate vulnerability is influenced by several personal, environmental and social factors, which include age, the elevation of housing, or the strength of people's social networks (Preston et al., 2014).

Paavola et al. (2017) review the impacts of climate change on health in the UK, revealing significant social inequalities in the manner its impacts are distributed. While research projects a significant rise in heat-related mortality in the UK, from 45% by the 2020s to 167% by the 2050s (Hajat et al., 2014), these impacts are far from evenly distributed. Vulnerability to extreme heat tends to be higher in southern and eastern regions of the country, while residents of densely populated urban centres face additional risk due to the 'urban heat island' effect (Heaviside et al., 2016). When it comes to flooding, those residing in social housing and economically deprived households are disproportionately concentrated in areas vulnerable to coastal and riverine flood risk (Houston et al., 2011). These households, who often include tenants, tend to be less able to move out or to retrofit their homes to hedge against flooding (Walker et al., 2006). In coastal areas, vulnerability is further compounded by the economic deterioration of former seaside resorts (Lindley et al., 2011) and an above-average concentration of older residents (Oven et al., 2012).

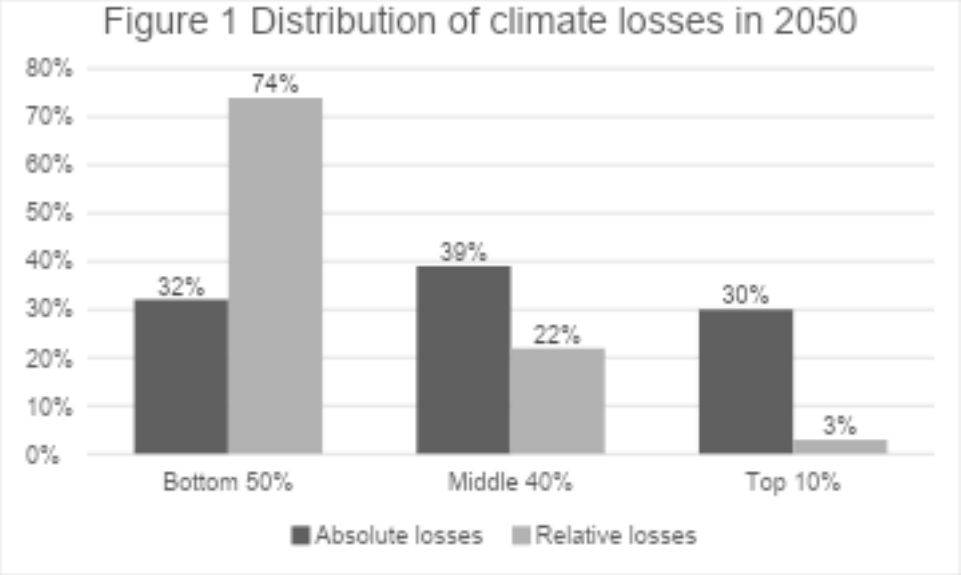
Who Bears the Cost?

In an attempt to draw a profile of those most affected by climate change, Lindley et al. (2011) identify vulnerability as shaped by five key dimensions: sensitivity (including age and health status), exposure to physical environmental conditions such as housing quality, and the capacity to prepare for, respond to, and recover from climate-related hazards. They conclude that the most severe impacts tend to occur where high socio-spatial vulnerability overlaps with significant exposure to climate risk. Within this group, consensus has emerged to consider older people at greatest risk of extreme climate events such as heatwaves and flooding (Preston et al., 2014). This is especially important for the UK, where heat-related deaths are expected to increase

dramatically, which can affect the long-term capacity of health facilities across the country.

Another vulnerable group is low-income households. These groups are disproportionately affected by climate events and are often unable to prepare or respond to them (Walker et al., 2006). Middle-income households' *wealth* is also more at risk from climate change, as these groups often hold assets in the form of real estate, compared to mobile capital assets for higher-income groups (Fig. 1) (Chancel et al., 2025).

Thus, in order to fully assess the impacts of climate change, an accurate perspective requires conceptualising economic, social and environmental dimensions as interconnected and mutually reinforcing spheres (Sabato & Mandelli, 2018). Yet it appears that public policy is often at odds with this system-centric approach and tends to embrace the 'eco-social-growth trilemma' (Sabato et al., 2022). This term highlights the perceived trade-offs of public policy between economic, social and environmental performance goals. It is not clear, however, that climate adaptation policies which embrace the possibilities for economic growth are always effective in mitigating the dilemma of social justice. Evidence for this is addressed in the next section.



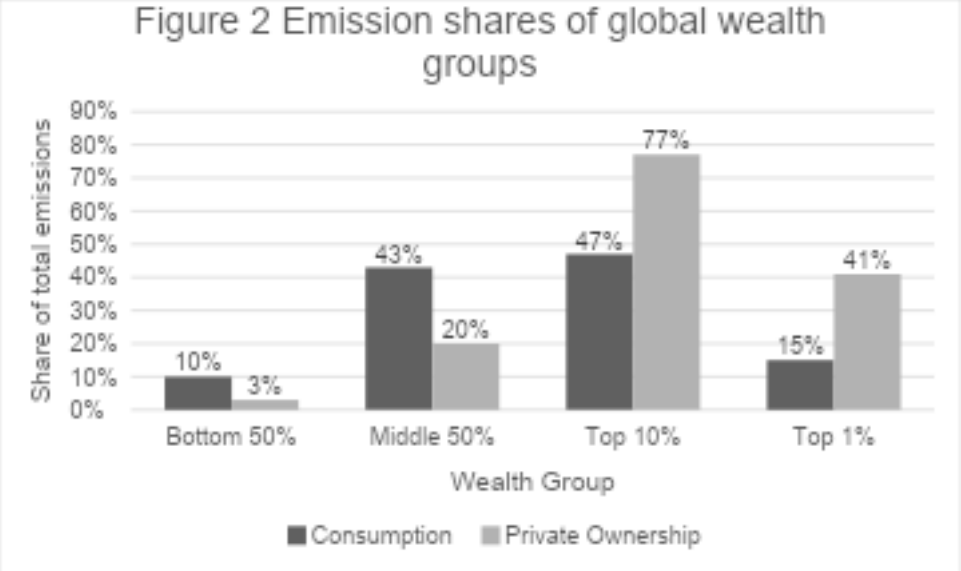
Sources: Chancel et al. (2025); Bothe et al. (2025)

Climate Inequality in Mitigation

Wealth Drives Climate Change

It has been highlighted that the impacts of climate change are unevenly distributed. Chancel et al. (2025) also find evidence that wealthier households are disproportionately responsible for climate change, with the top income decile contributing to almost half of C02 emissions worldwide. The relative costs of adaptation are also highly unequal, as the poorer tend to benefit less from the implementation of climate policies. The authors point to wealth inequality as the primary driver for this 'triple inequality crisis' (Chancel et al., 2025).

Why does this matter? Crucially, the efficiency of climate mitigation policies requires targeting the problem intended. As Chancel et al. (2025, p. 10) argue, focusing mitigation efforts on the highest emitters represents an efficient approach, as those at the top of the emissions distribution generally face a lower marginal cost of action. Individuals who contribute disproportionately to the climate crisis tend to have both greater rooms to cut their emissions and stronger financial means to transition towards low-carbon alternatives.



Sources: Chancel et al. (2025); Bruckner et al. (2022); Chancel & Rehm (2025b)

In particular, the authors use an ownership-based approach to inequality, highlighting that 58% of global emissions can be attributed to private capital (Chancel & Rehms 2025a, 2025b). Using this metric, top wealth deciles in France, Germany and the US contribute three to five times as much to carbon emissions than consumption-based approaches, with over 75% of emissions stemming from capital ownership in those countries (Chancel & Rehms, 2025a). This effect is linked to the

specific investment patterns of wealthy households, which tend to be more carbon-intensive (Ohendorf et al., 2021). Globally, top 1% households emit over 680 times more than an individual in the bottom half (Chancel et al., 2025). It is therefore crucial that policy tackles the problem of capital as well as consumption when seeking to adopt a just and efficient approach.

Climate Mitigation and Inequality

A second problem highlighted by the authors is the unequal impact of certain climate mitigation measures. Market-based policies such as carbon taxes are regressive, as they affect poorer households' income disproportionately (Ohlendorf et al., 2021). Crucially, this means that adaptation to climate change risks exacerbating existing inequality and causing potential backlash, to the image of the 2017 'yellow vest' movement in France. Another, and often overlooked problem is the relationship between *ownership* of green investments and future inequality. Chancel et al. (2025) project that if the top 1% were to retain ownership of their assets and finance the entire stock of required climate investments, their wealth share could rise from 38.4% in 2025 to 46% by 2050. If these investments are funded by the state through wealth tax, and resulting assets were owned by the public sector, the top 1% share could fall by 13 percentage points by 2050. Thus, the capacity for the state to finance green investments may have significant effects on inequality in the future and must therefore be a central objective for climate policy in the UK.

A Framework for Climate Adaptation in the UK

Resilience Networks

The evidence presented above suggests that in order for climate adaptation to be both effective and just, policy must understand the interrelationships between social, economic and environmental concerns. The following approach, which we might call a 'sustainable welfare approach,' aims to reconcile these three spheres for a coherent and just policy for climate change mitigation (Büchs & Koch, 2017).

The first step toward achieving resilience is ensuring that vulnerable populations are less at risk of extreme weather events such as flooding or heat waves. This requires a deeper understanding and mapping of socio-spatial inequalities, to target areas most in need of future government aid. While the responsibility to hedge against climate

change risks is split between different government agencies (Defra, DECC, Cabinet Office *etc*.), it may be more effective to centralise decision-making under a unified banner to provide a clear line for climate change mitigation.

At the local level, vulnerable communities need to be adequately supported through effective 'resilience networks.' In practice, this could include increasing tenancy protection to encourage landlords to fund insulation or external shading (Preston et al., 2014; DoH, 2013). Preston et al. (2014) emphasise the role of Local Resilience Forums (LRFs) in establishing community engagement and resilience. These forums are 'multi-agency partnerships made up of representatives from local public services, including the emergency services, local authorities, the NHS, the Environment Agency and others' (GOV.UK, 2013). Using a proposal from Twigger-Ross et al. (2011), they suggest that these structures could work more closely with existing social networks by including community representatives to the forums. Giving a voice to local communities also means that they are more likely to accept mitigation policies in the long run and proves more effective at supporting vulnerable groups (Gross, 2007). Local governments could therefore lead state planning and deliver adequate ventilation and insulation. Framing these issues in terms of health rather than environmental concerns may also provide an incentive for local communities to engage more readily towards climate action (Costello et al., 2009).

Progressive Green Infrastructure Investment

Another important step towards climate resilience in the UK is extensive public investment in green infrastructure. Investments for urban heat reduction, coastal flood protection and water management are a critical requirement to mitigate the health effects related to climate change. Though there has been an increase in the number of homes insulated to an EPC C or higher, from 15% in 2011 to 47% in 2024, most of this increase occurred between 2011 and 2013 (Hodgkin & Sasse, 2022). This suggests that there remains much to be done to future-proof homes, which is essential for maintaining healthy occupants as well as reduce the carbon footprint of household energy consumption (Sajjadian et al., 2015).

With the Labour government's current plan to build affordable housing, there is an opportunity for new forms of social housing that are resilient to climate change (Weng, 2017). Because social housing is home to those most vulnerable to climate change, it is

essential that green investment is aimed at retrofitting existing homes as well as building adapted infrastructure. Such investment is essential for tackling climate inequality, as energy poverty caused by rising prices has increasingly affected lower-income households, with direct effects on health, education and employment (Gonzales-Eguino, 2015). The UK is also the country in Europe with the housing stock that performs most poorly (Nicol et al., 2016), suggesting that there is much room for improvement. *Friends of the Earth* (2024) have recently estimated the cost of retrofitting all low-income households in the UK at £74.5bn, which implies an expenditure of £7.4bn per annum over the next ten years.

Redistributive Finance Mechanism

In order to achieve such levels of investment, Chancel et al. (2025) suggest tackling the question wealth inequality. In particular, they argue that a carbon-adjusted tax on wealth and investments may fulfil the dual task of crowding out carbon-intensive investments, while also financing climate resilience. This measure is efficient, because unlike consumption, investment decisions are highly elastic. In a recent study, Chancel and Rehms (2025a) estimate that a €150 tax per ton on the carbon content on wealth could yield approximately €36bn in France and €74bn in Germany. While this may not cover the entire costs for required green investment and is likely to decrease as individuals shift their investments, it provides a comparable scale to that which is required. Most importantly, the authors highlight that such investment in green infrastructure needs to be public owned in order to prevent the capture of private rents, to ensure universal and just access to green infrastructure, and to curb the rise in wealth inequalities. As previously mentioned, locally owned cooperatives and community energy models also offer a way to keep the benefits of energy generation within communities, ensuring that revenues are reinvested locally and that residents retain meaningful control over key infrastructure.

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