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Are Climate Policies Deepening Environmental Inequalities? A Politico-Geographical Perspective

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Abstract

Climate change is widely framed as a universal environmental challenge, yet its impacts and policy responses remain deeply uneven across space and society. While climate policies are designed to mitigate environmental degradation and promote sustainability, growing evidence suggests that they may also reproduce or intensify existing environmental inequalities. This paper examines climate policies through the lens of political geography to explore how power relations, spatial arrangements, and governance structures shape unequal environmental outcomes. Focusing on global and Global South contexts, the study argues that climate policies are not politically neutral instruments but are embedded within territorial priorities, economic interests, and institutional asymmetries. Through the integrating of policy analysis with spatial inequality frameworks, the paper highlights how mitigation and adaptation strategies often privilege certain regions, sectors, and social groups while marginalizing others. The study draws on secondary data from international climate reports, development indicators, and policy documents to demonstrate how uneven policy implementation contributes to differentiated vulnerability. The paper concludes that without addressing underlying political and spatial inequalities, climate policies risk reinforcing environmental injustice rather than resolving it.

Keywords: *Climate policy, environmental inequality, political geography, climate governance, spatial justice*

INTRODUCTION

Climate change is widely acknowledged as a global environmental phenomenon; however, its causes, impacts and responses are far from uniform across the globe (Vitousek, 1992). Rising temperatures, averaging 1.5°C above pre-industrial levels, shifting rainfall patterns, more frequent extreme weather events, and ecological degradation are being experienced unevenly across regions and societies, with vulnerable populations being most affected (Warren et al., 2022). This unevenness is not accidental but closely linked to historical development trajectories, socio-economic structures and political decision-making processes. While climate change is often presented as a shared global challenge, its environmental burdens are disproportionately borne by regions and communities with limited adaptive capacity, particularly in the Global South (Ngcamu, 2023). Understanding climate change, therefore, requires moving beyond universalized narratives and examining it as a spatially differentiated environmental process.

The Global South is central to climate debates, as most countries in Asia, Africa, and Latin America, which comprise the Global South, face high climate risks despite accounting for only a small share of historical greenhouse gas emissions (Tables 01, 02, and 03). Many low-income nations have contributed less than 5% of cumulative CO_2 emissions since 1850, while wealthier nations have dominated the historic totals (Chancel & Piketty, 2015). Rapid urbanization, reliance on climate-sensitive livelihoods, and limited institutional capacity exacerbate vulnerability in these regions, where over 55% of the population in Asia and Africa now resides in urban or peri-urban areas vulnerable to climate hazards (Abuje, 2021). Over the past two decades, climate policies have expanded significantly in the Global South, encompassing mitigation strategies such as renewable energy transitions and adaptation measures focused on resilience and risk

reduction (Taylor et at., 2023). These policies are often framed as pathways toward sustainable and inclusive development.

Table 1: Top CO_2 Emitters in the Global North and Global South (2017)

(Emissions in million tonnes (Mt); p.c. = per capita emissions in tonnes)

Global CO_2 Emissions

Category	**Total CO_2 Emissions (Mt)**	**Per Capita (t)**

World	36,153	5.0

Global North

Country / Group	**CO_2 Emissions (Mt)**	**Share (%)**	**Per Capita (t)**
Global North (total)	13,72510.6		
USA	5,270	38%	16.0
EU-28	3,544	26%	7.0
Russia	1,693	12%	12.0
Japan	1,205	9%	9.5
South Korea	606	4%	12.0
Top 5 total	**12,318**	**90%**	
Others	1,407	10%	

Global South

Country / Group	**Total CO_2 Emissions (Mt)**	**Share (%)**	**Per Capita (t)**
Global South (total)	21,016		3.4
China	9,839	47%	7.0
India	2,467	12%	1.8
Iran	672	3%	8.3
Saudi Arabia	635	3%	19.0
Mexico	490	2%	3.8
Indonesia	487	2%	1.8
Brazil	476	2%	2.3
South Africa	456	2%	8.0
Turkey	448	2%	5.5
Thailand	331	2%	4.8
Top 10 total	**16,301**	**78%**	
Others	4,715	22%	

Source: Global Carbon Atlas (online)

Table 2: CO_2 Emissions in the Global North and Global South (1990 and 2017)

(Emissions in million tonnes (Mt CO_2); p.a. = average annual growth rate)

Global Overview

Year	**CO_2 Emissions (Mt)**	**Share**
1990	22,210	100%
2017	36,153	100%
Growth (1990–2017)	+63%	1.8% **p.a.**

Global North

Country / Group	**1990 (Mt)**	**Share (%)**	**2017 (Mt)**	**Share (%)**	**Growth 1990-2017 (%)**	**p.a. (%)**
Global North (total)	15,156	68%	13,725	38%	**–9%**	**–0.4**
USA EU-28	5,121		5,270		3%	0.1
Russia	4,479		3,544		–21%	–0.9
Japan South Korea	2,571		1,693		–34%	–1.5
	1,155		1,205		4%	0.2
	247		606		145%	3.4

Global South

Country / Group	**1990 (Mt)**	**Share (%)**	**2017 (Mt)**	**Share (%)**	**Growth 1990-2017 (%)**	**p.a. (%)**
Global South (total)	7,054	32%	21,016	58%	**198%**	**4.1**
China	2,420		9,839		307%	5.3
India Iran	617		2,467		300%	5.3
Saudi Arabia Mexico	209		672		222%	4.4
Indonesia Brazil	186		635		241%	4.7
South Africa	318		490		54%	1.6
Turkey Thailand	150		487		225%	4.5
	207		476		130%	3.1
	267		456		71%	2.0
	147		448		205%	4.2
	89		331		272%	5.0

Source: Global Carbon Atlas (online)

Table 3: Greenhouse Gas (GHG) Emissions in the Global North and Global South (1990 and 2014)
(Emissions in million tonnes CO_2 equivalent (Mt CO_2), including land-use change and forestry (LUCF); p.a. = average annual growth rate)

Global Overview
Global North *Country / Group Year* GHG Emissions (Mt CO_2) Share

1990	33,823	100%
2014	48,892	100%
Growth (1990–2014)	**+45%**	**1.5% p.a.**

	1990 (Mt CO_2)	Share (%)	2014 (Mt CO_2)	Share (%)	1990–2014 (%)	P.A. (%)
Global North (total)	16,004	47%	15,491	32%	–3%	**–0.1**
USA EU-28 *Russia Japan South Korea*	5,550		6,319		14%	0.5
	4,950		3,625		–27%	–1.3
	3,227		2,030		–37%	–1.9
	1,097		1,322		21%	0.8
	256		631		146%	3.8

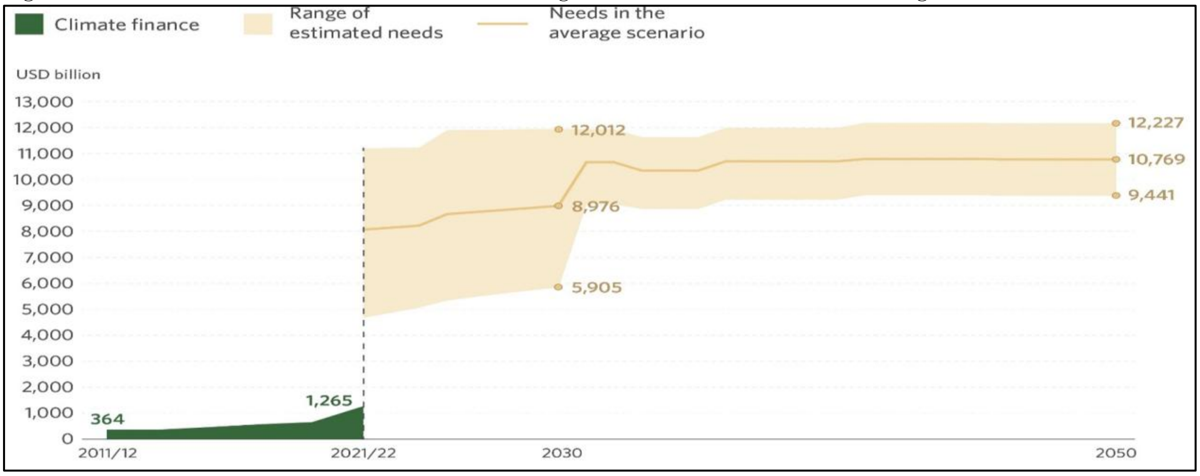
Global South

Country / Group	1990 (Mt CO_2)	Share (%)	2014 (Mt CO_2)	Share (%)	1990–2014 (%)	p.a. (%)
Global South (total)	14,809	44%	30,663	63%	**107%**	**3.1**
China India Iran Saudi Arabia Mexico Indonesia Brazil South Africa Turkey Thailand	2,833		11,601		309%	6.0
	1,142		3,202		180%	4.4
	250		801		220%	5.0
	188		583		210%	4.8
	446		729		63%	2.1
	1,337		2,472		85%	2.6
	1,448		1,357		–6%	–0.3
	309		527		71%	2.2
	178		367		106%	3.1
	165		373		126%	3.5

Source: Climate Watch (CAIT-Global Historical Emissions)

Evidence from policy reports and empirical studies up to early 2023 shows that climate interventions often yield uneven results across regions and social groups (Fig 01). For example, adaptation finance -critical for helping vulnerable communities cope with climate impacts -accounts for only about 9–10 % of total global climate finance, while mitigation dominates most flows, leaving adaptation severely underfunded in high-risk areas (Barrett, 2013). International assessments like the Climate Adaptation Finance Index reveal that around 90 % of developing countries receive less funding than their climate risk would justify, with many nations receiving well under half of their risk-adjusted share (Garschagen & Doshi, 2022). Consequently, while climate investment disproportionately benefits urban centers, affluent regions, and economically strategic sectors with better institutional capacity, peripheral areas and marginalized populations frequently remain inadequately protected. These disparities raise critical questions about the distributive consequences of climate policies and whether, in practice, they may inadvertently deepen environmental inequality instead of alleviating it.

Fig 01: Global Tracked Climate Finance and average estimated annual needs through 2050.

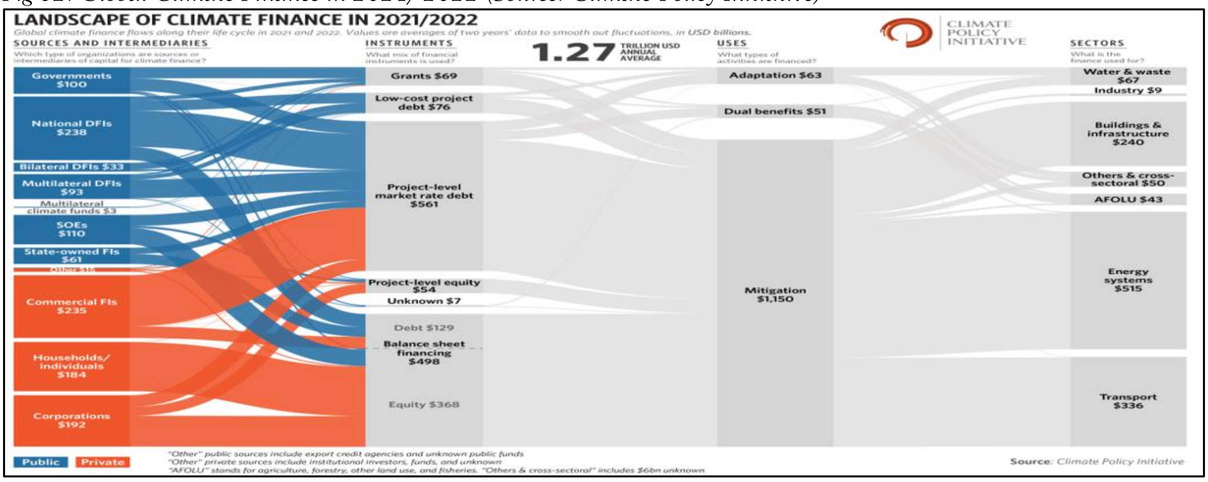


Source: Climate Policy Initiative

Between 2018 and 2022, just 34 % of international public climate finance went to adaptation and resilience, with the rest directed toward mitigation, despite adaptation being crucial for vulnerable regions (Watkiss et al., 2023). Approximately 3.0 % of global climate finance has reached urban poor communities, a fraction of the funding needed in climate-vulnerable, low-income settlements (United Nations Environment Programme, 2023). Despite developed countries surpassing the long-promised $100 billion annual climate finance target in 2022, adaptation finance remains only about 28–34 % of total climate funding, far below the balanced goal of equal investment in adaptation and mitigation (Gordon, 2023). Meanwhile, developing countries are estimated to need approx $300–$350 billion annually by 2035 just to adapt to climate change impacts, yet current adaptation funding flows are only a small fraction of this requirement (Bowen et al., 2023). This technocratic framing of climate governance as a neutral., science-driven response can mask the social and spatial consequences of policy decisions, particularly in contexts where governance capacity is uneven and development priorities are contested.

In the Global South, climate policy formulation and implementation are shaped by multiple layers of influence. International climate frameworks, donor agencies, and development institutions play a significant role in setting priorities and defining acceptable policy pathways (Pokharel, 2019). For instance, over approx 60 % of climate adaptation funding in low- and middle-income countries originates from international donors, often targeting sectors and regions prioritized by external agendas (Songwe et al., 2022). National governments adapt these frameworks to align with domestic political agendas, economic strategies, and territorial priorities, but less than approx. 20 % of climate finance reaches local governments or community- led initiatives. Local communities, despite being most directly affected by climate impacts, frequently have limited influence over policy design and resource allocation (Desai, 2022). This multi-scalar governance structure creates conditions under which climate policies may privilege politically or economically strategic spaces while marginalizing peripheral or vulnerable areas, perpetuating uneven adaptation and resilience outcomes.

Fig 02: Global Climate Finance in 2021/2022 (Source: Climate Policy Initiative)



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This disconnect emphasizes that climate policies are not only environmental tools but also political and spatial processes. Decisions on project location, funding allocation, and whose knowledge informs policy are inherently political., shaping vulnerability across regions. For example, over 70 % of adaptation funding in developing countries is directed to urban or politically prioritized areas, leaving rural and marginalized communities under-resourced (Hennessey, 2021).

Global climate finance reached an estimated USD 1.46 trillion in 2022, yet only around 5–9 % of total climate finance went to adaptation efforts that directly benefit vulnerable communities, exposing major gaps in equity (Acquah, 2023). For Least Developed Countries (LDCs), adaptation-related development finance tripled from USD 6 billion in 2015 to approx. USD 20 billion in 2023, but this still covers only a fraction of actual needs (OECD, 2024). Africa received just 20 % of global adaptation finance (about USD 13 billion) in 2021–2022 despite high climate risks, compared with 45 % going to East Asia and the Pacific, showing stark geographic disparities (Anjanappa et al., 2024). These inequities are compounded by the fact that developed regions and mitigation projects attract the bulk of funding, leaving many climate-vulnerable communities with limited support. Political geography helps reveal how climate policies interact with power, territory, and institutional capacity, showing that unequal governance arrangements shape spatial patterns of risk and protection in the Global South.

Research Objectives

To evaluate climate policy implementation through a politico-geography lens.

To examine whether climate policies in the Global South are producing uneven environmental outcomes across regions and social groups.

To analyze how and spatial factors influence the distributional impacts of climate policies.

Research Questions

Do climate policies reduce environmental inequality uniformly across space in the Global South?

Which regions and communities benefit most from climate interventions, and which remain marginalized?

How do power relations and governance structures shape climate policy outcomes?

CONCEPTUAL AND THEORETICAL FRAMEWORK

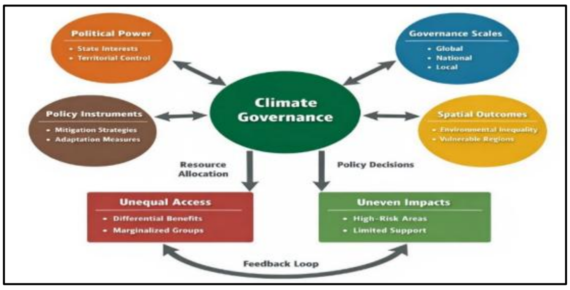
Politico-geography and Climate Governance

Political geography provides a critical lens for understanding climate governance as a spatial exercise of power (Abrahams & Carr, 2017). Central to this perspective are the concepts of space, power, and territory. Space, in this context, is not a passive backdrop but an active dimension through which climate governance operates. The spatial allocation of climate projects, infrastructure investments, and adaptation measures reflects political priorities and institutional capacities. Certain regions are designated as strategic, productive, or vulnerable, influencing where resources are directed. These spatial decisions shape environmental outcomes and contribute to uneven patterns of protection and risk.

Environmental Inequality and Spatial Justice

Environmental inequality refers to the uneven distribution of environmental risks, resources, and opportunities across social groups and geographic spaces (Newell, 2005). Spatial justice extends this understanding by emphasizing fairness in the spatial distribution of environmental benefits and burdens (Soja, 2013). From this perspective, climate vulnerability is not an inevitable outcome of geographic location but a politically produced condition (Fig 03). Governance decisions influence who is protected, who receives investment and whose livelihoods are prioritized.

Fig 03: Conceptual Framework



Communities located in peripheral or economically marginalized regions often face higher climate risks while receiving limited policy attention (Bennett & Dearden, 2014). This framework recognizes climate vulnerability as a political outcome shaped by governance arrangements, institutional capacity, and resource allocation.

Methodological Approach

Spatial analysis forms a central component of the methodology, reflecting the study's political geography orientation. Regional comparisons are employed to examine variations in climate policy implementation and environmental outcomes across different spatial units. Indicators related to climate exposure, policy investment, and adaptive capacity are analyzed to identify spatial disparities. This spatial approach enables the identification of regions that benefit disproportionately from climate policies and those that remain marginalized.

Qualitative interpretation is guided by politico-geography emphasizing power relations, governance scales, and territorial dynamics. Interview data and policy narratives are analyzed to understand how decisions are made, whose interests are prioritized, and how authority is distributed across governance levels. This interpretive approach allows the study to move beyond descriptive analysis and engage critically with the political dimensions of climate governance. Climate vulnerability is examined as a socially and politically constructed outcome rather than a purely environmental condition (Fig 04).

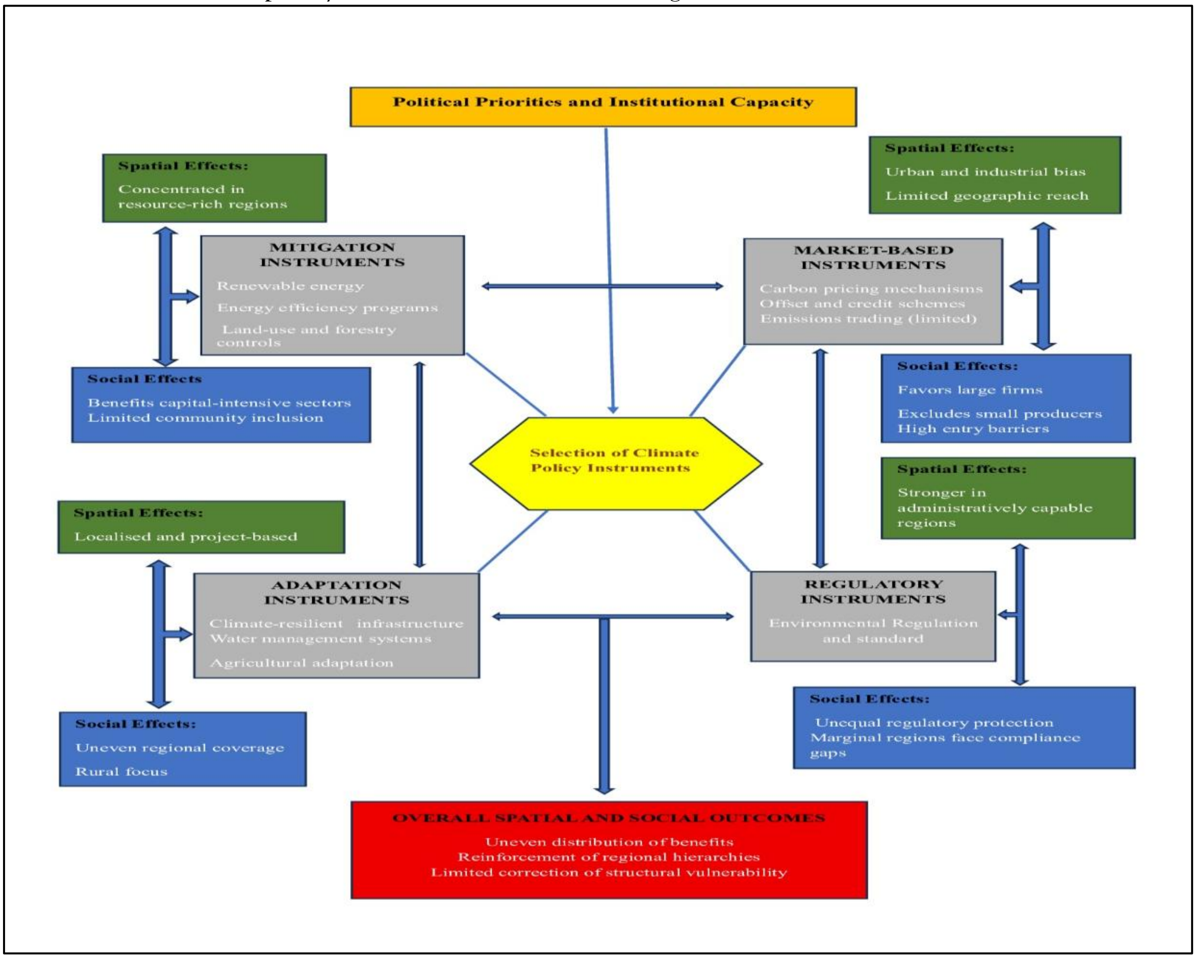


Fig 04: Selection of Climate Policy Intervention

Climate Policies in the Global South: An Overview

Evolution of Climate Mitigation and Adaptation Policies

The early engagement of the Global South with climate policy was largely framed around vulnerability and adaptation rather than mitigation (Chu et al., 2016). During the initial phases (Table 04) of global climate negotiations, developing countries emphasized their limited responsibility for greenhouse gas emissions and highlighted the need for financial and technological support (Heller et al., 2003). Consequently, climate action was primarily viewed as an extension of development planning rather than as an independent environmental agenda.

Table 4: Evolution of Climate Policy Approaches in the Global South (Early 1990s-Present)

Policy Phase	Period	Dominant Framing	Policy Objectives	Typical Instruments	Sectoral Focus	Representative Examples (Countries/Regions)	Limitations
Early Negotiation Phase	1992-2000	Vulnerability & Equity	Secure recognition of historical responsibility; prioritize development needs	National Communications to UNFCCC; adaptation assessments	Agriculture, water, health	Least Developed Countries (LDCs), Small Island Developing States (SIDS)	Limited implementation capacity; dependence on external finance
Adaptation-Centric Planning	2001-2008	Risk Reduction	Reduce climate sensitivity of key livelihoods	National Adaptation Programmes of Action (NAPAs); donor-funded projects	Agriculture, coastal zones, disaster management	Bangladesh, Nepal, Ethiopia	Project-based, short-term, weak institutional integration
Dual Adaptation-Mitigation Phase	2009-2014	Co-benefits & Development	Align mitigation with growth and energy access	Nationally Appropriate Mitigation Actions (NAMAs); renewable energy missions	Energy, transport, forestry	India, Brazil, South Africa	Mitigation secondary to economic priorities
Institutional Expansion	2015-2019	Integrated Climate Governance	Mainstream climate action into development planning	Nationally Determined Contributions (NDCs); climate finance mechanisms	Energy, industry, urban infrastructure	Mexico, Indonesia, Vietnam	Uneven sectoral coverage; finance gaps
Contemporary Mixed Strategy	2020-Present	Resilience + Low-Carbon Growth	Balance adaptation needs with long-term decarbonization	Updated NDCs; Long-Term Low Emission Development Strategies (LT-LEDS)	Energy transition, climate-resilient infrastructure	India, Chile, Morocco	Implementation challenges; political and fiscal constraints

Changing emphasis from vulnerability-based adaptation to mixed adaptation–mitigation strategies in the Global South

Over time, this perspective gradually shifted. As climate impacts intensified and global frameworks expanded, countries in the Global South increasingly adopted formal mitigation strategies alongside adaptation measures (Araos et al., 2017). National climate action plans, sector-specific mitigation targets, and renewable energy initiatives have gained prominence in this way. However, mitigation efforts were often designed to align with economic growth objectives, such as energy security and industrial expansion, rather than emissions reduction alone.

Adaptation policies continued to dominate climate governance in many regions, reflecting immediate environmental risks such as droughts, floods, and coastal erosion (Termeer et al., 2011). These policies focused on enhancing resilience through infrastructure development, agricultural adjustments, and disaster risk management. Despite their prominence, adaptation measures frequently remained project-based and reactive, addressing symptoms rather than structural drivers of vulnerability (Weichselgartner & Kelman, 2015).

Dominant Policy Instruments

Climate policies in the Global South employ a range of policy instruments, each carrying distinct spatial and social implications (Markkanen & Anger-Kraavi, 2019). Mitigation instruments commonly include renewable energy deployment, energy efficiency programs and land-use regulations (Hernandez et al., 2015). Large-scale renewable energy projects, particularly those involving solar and wind energy, have become central to national mitigation strategies (Liu et al., 2020). These projects are often concentrated in regions with favorable climatic conditions and existing infrastructure, resulting in spatial clustering of climate investments.

Table 5: Adaptation vs Mitigation Priorities across Selected Global South Regions

Region	APL	MPL	DCR	TAM	TMM	GC
South Asia	Very High	Medium	Floods, droughts, heatwaves	Irrigation reform, climate-resilient crops, early warning systems	Solar missions, energy efficiency	Strong planning institutions, finance constraints
Sub-Saharan Africa	Very High	Low-Medium	Drought, food insecurity	Livelihood diversification, water harvesting	Clean cooking, off-grid renewables	High donor dependence
Southeast Asia	High	High	Sea-level rise, storms	Coastal protection, urban drainage	Renewable energy, transport efficiency	Rapid urbanization
Latin America	Medium	High	Glacial melt, deforestation	Ecosystem-based adaptation	Forest conservation, bioenergy	Strong environmental institutions
Small Island States	Extreme	Low	Sea-level rise, cyclones	Relocation, coastal defenses	Limited due to scale	Existential climate risks

Regional variation in climate governance priorities and policy instruments: Adaptation Priority Level: APL; Mitigation Priority Level: MPL; Dominant Climate Risks: DCR; Typical Adaptation Measures: TAM; Typical Mitigation Measures: TMM; Governance Characteristics: GC.

Adaptation instruments are more diverse and context-specific (Table 05). Common measures include climate-resilient infrastructure, water management systems and agricultural adaptation programs (Srivastav et al., 2021). These instruments are frequently implemented through targeted projects rather than integrated regional planning (Yushkova, 2014). While such projects address localized risks, they may also create uneven protection, with certain regions receiving sustained attention while others remain neglected.

Market-based instruments, such as carbon pricing and offset mechanisms, have been introduced in limited forms (Shen et al., 2023). Where implemented, these instruments tend to favor actors with greater financial and institutional capacity, often excluding small producers and marginalized communities (Shiferaw et al., 2011). Regulatory instruments, including environmental standards and zoning regulations, are similarly shaped by enforcement capacity, which varies significantly across regions (Gunningham, 2009).

Role of International Frameworks and Funding

International climate agreements have played a *decisive* role in shaping climate policy across the Global South by providing not only normative guidance but also technical knowledge, financial mechanisms, and standardized reporting frameworks (Khan & Roberts, 2013). Through instruments such as Nationally Determined Contributions & periodic reporting under the UNFCCC, countries align domestic policy with global carbon reduction and adaptation objectives, increasing comparability and accountability (Table 06).

Table 6. Climate finance provided and mobilized (2013–2022)*(in USD billion)*

Component / Sub-component	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bilateral public climate finance	22.5	23.1	25.9	28.0	27.0	32.0	28.7	31.4	34.5	41.0
Multilateral public climate finance attributed to developed countries	15.5	20.4	16.2	18.9	27.1	30.5	34.7	36.9	38.7	50.6
Multilateral development banks	13.0	18.0	14.4	15.7	23.8	26.7	30.5	33.2	34.3	46.9
Multilateral climate funds	2.2	2.0	1.4	2.6	2.9	3.5	3.8	3.5	4.2	3.4
Inflows to multilateral institutions	0.3	0.4	0.4	0.6	0.5	0.3	0.3	0.2	0.2	0.3
Subtotal (1 + 2)	37.9	43.5	42.1	46.9	54.1	62.5	63.4	68.4	73.1	91.6
Climate-related officially supported export credits	1.6	1.6	2.5	1.5	3.0	2.7	2.6	1.9	2.1	2.4
Subtotal (1 + 2 + 3)	39.5	45.1	44.6	48.5	57.1	65.2	66.0	70.2	75.2	94.1
Mobilized private climate finance	12.8	16.7	N/A	10.1	14.5	14.7	14.4	13.1	14.4	21.9
By bilateral public climate finance	6.5	8.1	N/A	5.2	4.0	3.8	5.8	5.1	5.6	9.2

By multilateral public climate finance	6.2	8.6	N/A	4.9	10.5	11.0	8.6	8.0	8.8	12.7
Grand Total (1 + 2 + 3 + 4)	52.4	61.8	N/A	58.5	71.6	79.9	80.4	83.3	89.6	115.9

Source: *Based on Biennial Reports to the UNFCCC, OECD DAC statistics, OECD 2022.*

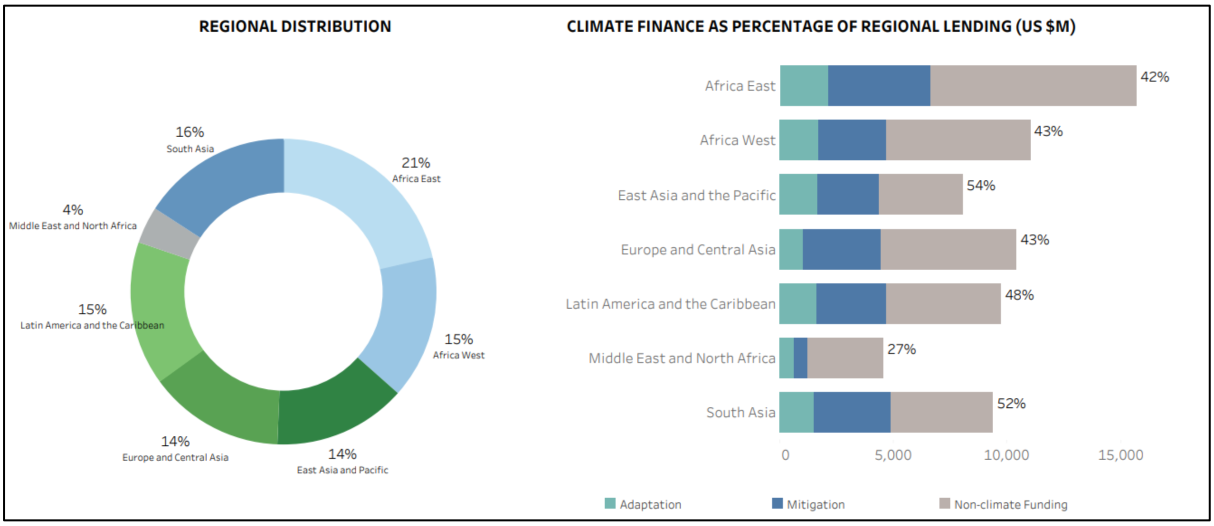


Fig 05: region-wise Distribution (Source: World bank climate finance 2024)

When we see the fig 05, within regions, climate finance tends to be concentrated in countries and subnational areas with stronger administrative systems and political stability (Mello & Ter-Minassian, 2024). When we see the South Asia, for example, found that India received around approx. 50 % of MDB climate finance in the region, with several other countries receiving disproportionately small shares due to lower institutional readiness and capacity.

Another pattern emerges in the balance between mitigation and adaptation funding: historically, most climate finance has been directed toward mitigation, especially in the energy and transport sectors, while adaptation finance has lagged behind, despite the disproportionate impacts of climate change on poorer regions (Fig 06). These patterns differ significantly across income groups. In lower-income countries, *adaptation finance* can constitute up to 50% of total climate finance, compared to 15% in upper-middle-income countries.

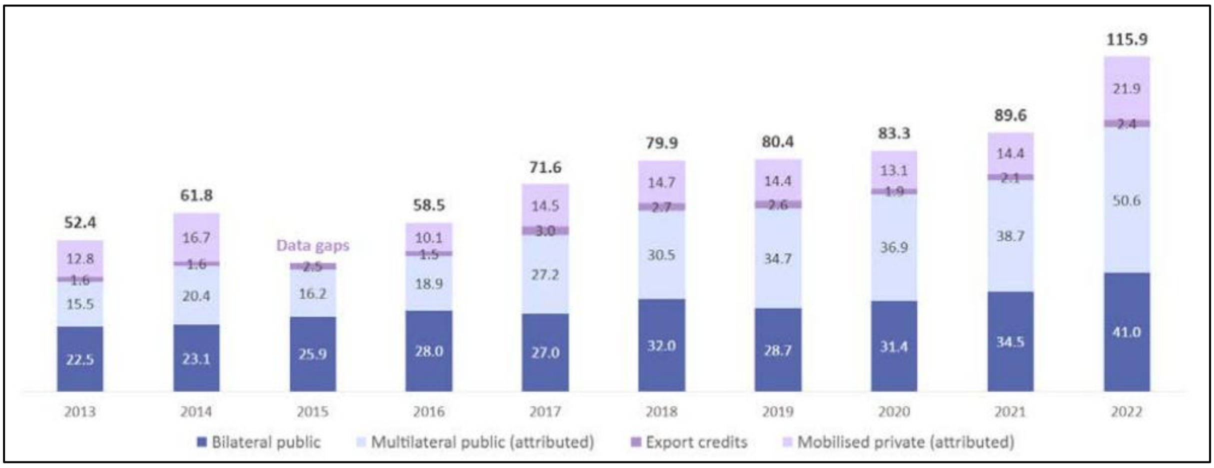


Fig 06: Climate finance provided and mobilized in 2013-2022 (USD billion)
**(X-axis-year; Y-axis -USD Climate Finance)*
(World Bank Climate Finance-2024)

Note: *The sum of components may not add up to totals due to rounding. The gap in time series in 2015 for mobilised private finance results from the implementation of enhanced measurement methods. As a result, grand totals in 2016-22 and in 2013- 14 are not directly comparable. Source: Based on Biennial Reports to the UNFCCC, OECD DAC and Export Credit Group statistics, complementary reporting to the OECD.*

*An examination of component-wise trends over the observed period reveals a marked expansion of public climate finance, alongside more recent but uneven growth in mobilised private finance. Public climate finance, comprising bilateral flows and multilateral finance attributable to developed countries, emerged as the dominant source, accounting for nearly 80 % of total climate finance in 2022. In absolute terms, public climate finance increased substantially from USD 37.9 billion in 2013 to USD 91.6 billion in 2022, reflecting a long-term upward trajectory. The year-on-year increase between 2021 and 2022 was particularly significant, representing the largest annual rise recorded to date, both in absolute terms (USD 18.5 billion) and in relative terms (25 %). Within the public finance category, multilateral public climate finance exhibited the most pronounced growth over the period. Between 2013 and 2022, multilateral public climate finance expanded by approximately USD 35 billion, corresponding to an increase of about 226 %, largely driven by enhanced climate commitments from multilateral development banks (MDBs). In comparison, bilateral public climate finance demonstrated steadier but more moderate growth, rising by USD 18.5 billion (82 %) over the same period. This divergence highlights the increasing centrality of MDBs in scaling up climate finance for developing countries. Private climate finance mobilised by public interventions presents a more recent and less consistent trend, given data limitations prior to 2016. After several years of relative stagnation, a notable acceleration occurred between 2021 and 2022, when mobilised private finance increased from USD 14.4 billion to USD 21.9 billion. This represents an increase of USD 7.5 billion, or 52 %, suggesting a renewed capacity of public finance instruments to leverage private investment under favourable policy and market conditions.

Spatial Orientation of Major Climate Interventions

Globally, climate finance continues to favour mitigation over adaptation (Barnard et al., 2014). As we observe the simple trend between 2018 and 2022, nearly two-thirds of international climate finance was directed toward mitigation activities, such as renewable energy, energy efficiency, and low-carbon infrastructure, while only about one-third supported adaptation and resilience (Songwe, 2022). This imbalance directly shapes spatial outcomes. Large-scale solar and wind projects are disproportionately concentrated in regions with high resource potential., solar deserts, wind corridors, and areas with existing grid infrastructure, because these locations promise technical efficiency and predictable returns (Hunaiti & Huneiti, 2024). As a result, mitigation investments tend to cluster in economically strategic areas rather than being distributed according to social vulnerability or ecological sensitivity.

Adaptation finance shows a similar pattern of spatial selectivity. Although developing countries are estimated to need between USD 300–500 billion annually for adaptation by the mid-2030s, current adaptation finance flows meet only a fraction of this demand (Ojha et al., 2024). Within countries, adaptation investments tend to prioritize urban centers, coastal economic hubs, and agriculturally productive regions that are framed as critical to national development and economic stability (Le, 2020). For example, global assessments indicate that less than 4 % of climate finance reaches urban poor and informal settlements directly, despite these areas facing disproportionate climate risks. Rural peripheries, ecologically fragile landscapes, and politically marginal regions often remain underfunded, even when vulnerability indicators are high (Tenza-Peral et al., 2022).

Regional evidence reinforces this uneven geography. In Africa, climate finance increased to over USD 40 billion annually in recent years, yet this amount still covers only around one-fifth of the continent's estimated climate needs (Belianska et al., 2022). Moreover, much of this finance is delivered as loans rather than grants, further constraining local adaptive capacity. In Latin America, more than 70 % of climate finance has historically been allocated to mitigation, with large economies such as Brazil capturing a dominant share, while smaller and poorer countries receive comparatively limited support (Kissinger et al., 2019). These patterns suggest that climate finance gravitates toward countries and regions with stronger institutional capacity, market readiness, and geopolitical visibility.

Politico-geography helps explain why these spatial biases persist. Climate policies are not neutral technical responses to environmental change; they are embedded within broader territorial strategies shaped by power relations, administrative reach, and political representation (Marquardt, 2017). Regions that contribute significantly to national growth or strategic security are more likely to be protected through climate investments, while less visible spaces remain exposed to climate risks (Gemenne et al., 2014). In this way, climate policies function as tools for managing territory and economic priorities, reinforcing existing spatial inequalities rather than correcting them.

Analysis of Spatial Evidence

Analysis of regional concentration, sectoral priorities, and urban–rural disparities indicates that climate investments are highly selective, favoring regions with higher economic output, stronger governance structures, and greater political visibility (Kythreotis et al., 2020). For example, OECD tracking data for 2022 shows that the top five recipient countries in the Global South, India, Brazil, China, Indonesia, and

Mexico, accounted for over 60 % of multilateral climate finance flows, despite representing less than half of the total population of developing nations. These flows largely supported mitigation-focused initiatives such as renewable energy and carbon reduction projects, emphasizing a pattern of spatial and sectoral prioritization that aligns with national economic and political significance.

At the subnational level, evidence points to pronounced urban–rural inequities. In India, World Resources Institute (2023) data indicates that urban districts received approximately 70 % more climate adaptation investment per capita than rural districts, even though rural populations are disproportionately exposed to extreme heat, droughts, and flood risk. Similarly, in African contexts, research by the African Development Bank (2021) demonstrates that coastal economic hubs and capital cities captured roughly 65–75 % of national climate adaptation projects, leaving peripheral and ecologically fragile regions underfunded (AfDB, 2021).

Sectoral allocation further compounds spatial inequality. While mitigation funding tends to flow toward energy-intensive or economically strategic regions, agriculture, water management, and informal settlement resilience programs, sectors critical to rural and low-income populations, receive a comparatively smaller share of finance. Data from the Global Environment Facility (2023) shows that agriculture and water-related adaptation projects represented only 22 % of total project financing, whereas renewable energy projects accounted for 58 %. This sectoral bias reinforces spatial inequities by disproportionately favoring regions aligned with national economic priorities.

These findings do not imply that climate policies are inherently inequitable. Rather, they operate within pre-existing politicat., economic, and spatial contexts. In countries where governance structures, administrative reach, and political representation are concentrated in certain regions, climate interventions reflect these inequalities. Without deliberate targeting mechanisms, such as formula-based allocations that prioritize vulnerability, or participatory planning that includes marginalized communities, climate policies risk inadvertently deepening environmental inequality. This evidence suggests that conditional climate policies can mitigate risk effectively in some areas, while simultaneously reinforcing existing disparities unless structural governance and spatial inequities are explicitly addressed.

CONCLUSION

This study demonstrates that climate policies in the Global South are inherently political and spatial processes rather than purely technical responses to environmental challenges. By combining spatial analysis, policy review, and qualitative insights, it becomes clear that the allocation of climate finance, project siting, and sectoral priorities often mirrors existing governance structures and economic hierarchies. The areas that are politically visible or economically strategic are almost always the first to benefit from climate interventions; vulnerability alone rarely dictates the allocation of attention. This illustrates that climate governance operates through power relations, institutional capacity, and territorial priorities, producing uneven benefits across regions and social groups.

Empirical evidence shows that mitigation projects, such as solar or wind energy installations, are concentrated in resource-rich regions and urban centres, while adaptation initiatives frequently bypass peripheral rural communities and informal settlements, despite their high exposure to climate hazards. Achieving equitable climate governance requires embedding social justice into the design, implementation, and evaluation of policies. Policies must proactively target vulnerable regions, enhance local participation, and recognize diverse development priorities. We want to believe in the new way, such as climate policy, without risking political awareness, protecting some while leaving others behind. Through foregrounding the spatial and political dimensions of climate action, this study offers a framework for developing climate interventions that are both environmentally effective and socially just, moving beyond risk management in select areas toward inclusive resilience for all communities.

Data Availability

The data supporting the findings of this study are available from the corresponding author and can be provided upon reasonable request.

Declaration of Competing Interest

The authors confirm that there are no known financial or personal relationships that could have influenced or biased the research reported in this article.

CRediT Authorship Contribution Statement

Seema Sahdev: Conceptualization, Methodology, Investigation, Data curation, Visualization, Writing-original draft preparation. Ravi Dass: Validation, Resources, Writing-review & editing. M.L. Meena: Writing –

review & editing, critical formal analysis.

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Annexure. Supplementary Data
Supplementary materials related to this article are available in the online version of the journal.

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Annexure I

Analytical Assessment of Climate Policies and Their Role in Producing Environmental Inequalities in the Global South

(UNEP (2023, 2024), OECD (2023), IPCC AR6, WRI (2024), UNFCCC, Brot für die Welt (2024)

Analytical Dimension	**Policy Assumption**	**Observed Policy Practice (Empirical Evidence)**	**Verified Facts & Figures**	**Spatial Outcome**	**Equity Implication**
Policy Framing	Climate policies promote equity and resilience	Equity language common, but implementation focuses on efficiency & scalability	Most NDCs prioritize emission reduction targets over distributive justice (IPCC AR6)	Selective territorial focus	Equity becomes rhetorical
Climate Finance Allocation	Funds flow to highest-risk regions	Funds flow to countries with higher institutional capacity	~90 % of developing countries receive less adaptation finance than risk-adjusted need (CAFI, 2024)	Underfunding of high-risk regions	Risk–finance mismatch
Adaptation vs Mitigation Balance	Balanced climate response	Mitigation dominates financial flows	Adaptation receives < one-third of total climate finance globally (OECD, 2023)	Adaptation-deficit regions	Vulnerable communities exposed
Regional Distribution	Vulnerable regions prioritized	Middle-income regions attract more funds	Africa receives ~20 % of global adaptation finance despite high vulnerability (UNEP)	Continental imbalance	Unequal protection
Urban–Rural Allocation	Inclusive territorial coverage	Urban & economic hubs prioritized	Infrastructure adaptation projects cluster in cities & corridors	Rural & fragile zones excluded	Rural vulnerability persists
Governance Scale	Multi-level participation	Centralized decision-making dominates	<20 % of climate finance reaches sub-national/local level (WRI, 2024)	Capital-centric governance	Local needs sidelined
Knowledge Systems	Local knowledge integrated	Technical expertise dominates	Policy design relies heavily on global models & consultants	Indigenous knowledge marginal	Epistemic inequality
Institutional Capacity	Need-based allocation	Capacity-based allocation	Countries with stronger bureaucracies attract more finance	Strong-state bias	Inequality reinforced
Historical Responsibility	Polluters bear higher costs	Low emitters bear adaptation burden	Least emitters among most underfunded states (IPCC AR6)	Inverse justice geography	Ethical failure
Sectoral Priorities	People-centered sectors	Energy & transport dominate	Energy sector receives majority of mitigation finance	Social sectors neglected	Social vulnerability
Land Use Impacts	Green transition is benign	Renewable projects alter land access	Solar/wind expansion linked to land conflicts in Global South	New pressure zones	Unequal local costs
Participation	Inclusive decision-making	Limited community participation	Local communities rarely involved in project design (UNEP, 2024)	Exclusionary governance	Democratic deficit
Temporal Logic	Long-term resilience	Short project cycles	Funding cycles rarely exceed 3–5 years	Fragmented adaptation	Chronic vulnerability
Donor Influence	Neutral funding	Donor priorities shape agendas	Sectoral & geographic preferences evident (OECD DAC data)	Donor-aligned geographies	External control
Policy Outcomes	Reduced vulnerability	Uneven resilience outcomes	Climate losses rising faster in LICs than MICs	Unequal resilience	Outcome gap
Overall Pattern	Climate-neutral governance	Politically mediated outcomes	Policies interact with power & territory	Uneven spatial protection	Inequality reproduced

*Annexure I provides a structured analytical framework to examine whether contemporary climate policies contribute to the reproduction of environmental inequalities, particularly in the Global South. Rather than treating climate governance as a purely technical response to environmental change, the table situates policies within broader political., institutional., and spatial contexts. It demonstrates that climate interventions are shaped by power relations, governance capacities, and territorial priorities, which collectively influence how environmental benefits and burdens are distributed.

The table synthesizes evidence from international assessments, policy reports, and peer-reviewed literature to compare normative policy assumptions with observed implementation patterns. A key insight emerging from this comparison is the persistent mismatch between climate risk and policy support. Despite repeated commitments to equity, adaptation finance and protective infrastructure are disproportionately directed toward regions with stronger institutions, higher economic value, or strategic importance, while highly vulnerable areas remain underfunded (UNEP, 2023; Brot für die Welt, 2024). This spatial selectivity reflects governance logics that prioritize efficiency, absorptive capacity, and donor preferences over need-based allocation (OECD, 2023).

By disaggregating climate governance across scales, from global finance mechanisms to local participation, the annexure highlights how centralized decision-making and technocratic policy design marginalize local knowledge systems and community priorities. It also draws attention to sectoral and temporal biases, such as the dominance of mitigation over adaptation and the reliance on short project cycles, which limit long-term resilience in vulnerable regions (IPCC, 2022; WRI, 2024).

Therefore, Annexure I reinforces the argument that climate policies function as political and spatial processes. Their outcomes are not neutral but are mediated through existing inequalities in power, capacity, and territory, raising critical concerns about their distributive consequences.

Annexure II

Climate Policy Instruments and the Pathways through Which Environmental Inequalities Are Produced in the Global South

Analytical Lens: Political Geography of Climate Governance

Geographical Focus: Global South

Policy Instrument	Stated Policy Objective	Implementation Logic	Empirically Observed Pattern	Verified Facts	Inequality Pathway	Spatial / Social Outcome	Contribution to Inequality Debate
Large-scale renewable energy (solar, wind)	Low-carbon transition	Land-intensive, grid-connected projects	Projects concentrated near urban & industrial corridors	Utility-scale renewables dominate capacity addition in Global South (IRENA, 2023)	Land access & displacement	Rural & pastoral communities bear costs	New environmental burdens
Renewable energy finance	Green growth	Private investment–led	Capital flows to low-risk regions	Majority of private climate finance flows to MICs (OECD, 2023)	Risk-based exclusion	LICs underfunded	Capital-driven inequality
Climate-resilient infrastructure	Reduce climate risk	Asset-focused protection	Infrastructure biased toward economic assets	Adaptation infrastructure clusters in cities (UNEP, 2023)	Asset-value prioritization	Informal settlements exposed	Unequal protection
Flood control projects	Disaster prevention	Engineering solutions	River embankments disrupt local livelihoods	Structural flood control linked to downstream risk transfer	Risk displacement	Marginal communities affected	Spatial redistribution of risk
Carbon markets	Cost-effective mitigation	Market-based offsets	Projects located where monitoring is easy	Carbon offset projects skewed toward forest-rich regions	Access & control issues	Indigenous land conflicts	Market-mediated inequality
Nature-based solutions (NbS)	Climate & biodiversity co-benefits	Conservation-led adaptation	Restrictions on traditional land use	Conservation-linked displacement documented in Global South	Conservation enclosure	Livelihood insecurity	Green exclusion
Climate-smart agriculture	Resilient food systems	Technology adoption	Benefits skewed to large farmers	Smallholders face adoption barriers (FAO, 2023)	Capacity & capital bias	Agrarian inequality	Uneven resilience
Urban climate planning	Urban resilience	City-led strategies	Formal areas prioritized	Informal areas underrepresented in plans	Legal invisibility	Urban poor exposed	Governance exclusion
Early warning systems	Reduce disaster mortality	Tech-driven dissemination	Limited last-mile connectivity	Rural & remote areas least covered	Information gap	Differential preparedness	Knowledge inequality
Water management reforms	Efficient allocation	Pricing & regulation	Poor households face access constraints	Cost recovery affects affordability	Economic exclusion	Water insecurity	Social vulnerability
Coastal protection	Safeguard coastlines	Hard infrastructure	Tourist & port zones prioritized	Fishing communities receive limited protection	Economic bias	Livelihood erosion	Sectoral inequality
Forest-based mitigation (REDD+)	Emission reduction	Performance-based payments	Centralized forest control	Community tenure often insecure	Governance capture	Indigenous marginalization	Institutional inequality
Climate insurance schemes	Risk transfer	Premium-based models	Low uptake among poor	Insurance penetration lowest among poorest groups	Affordability barrier	Unequal risk sharing	Market exclusion
Adaptation finance mechanisms	Build resilience	Project-based funding	Short funding cycles	Long-term vulnerability persists	Temporal mismatch	Chronic exposure	Structural inequality
Data-driven risk mapping	Evidence-based planning	Model-based assessments	Social vulnerability underrepresented	Technical indicators dominate	Epistemic bias	Mis-targeted policies	Knowledge hierarchy
Overall pattern	Equitable climate action	Technocratic deployment	Power & capacity shape outcomes	Climate losses rising fastest in LICs (IPCC, 2022)	Systemic inequality	Uneven resilience	Confirms research question

Sources: IPCC AR6 (2022), UNEP (2023, 2024), OECD (2023), WRI (2024), IRENA (2023), FAO (2023)