

Opportunities and limitations for social justice in Germany's climate adaptation policy

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Abstract In the quest for (more) effective adaptation, demands are rising in adaptation policy practitioners to address systemic injustices. In practice, however, adaptation incrementalism dominates, i.e. small-scale, reactive solutions, especially as it relates to addressing vulnerable populations. Germany is exemplary of these tensions. Little research investigates the larger context factors which impede the root causes of vulnerability from being addressed, how to transition away from incrementalism, and the role environmental agencies can play in this. Applying historical materialist policy analysis, the article follows a three-step approach which examines context, actors, and processes. The context analysis demonstrates how effective means for social redistribution were reduced since the mid-1980s in Germany's capitalist welfare state. This corresponds with heightened social vulnerability to climate change. The actor landscape is diversifying. In the past, social policy actors (and tasks) were underrepresented but are becoming more important. The policy process indicates a greater focus on vulnerable populations. Yet, the understanding of the structural root causes of peoples' vulnerability and financial resources of the policy field remain limited. This corresponds with informatory instruments of shallow depth. An improved root cause analytic coupled with new alliances and policy mixes are a good starting point towards greater social justice in adaptation.

Keywords Historical Materialist Policy Analysis · Policymaking · Social justice · Climate change adaptation · Transformative adaptation · Vulnerable populations

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Möglichkeiten und Grenzen für soziale Gerechtigkeit in der deutschen Klimaanpassungspolitik

Zusammenfassung Im Streben nach wirksamer(er) Klimawandelanpassung steigen die Anforderungen an Anpassungspraktiker:innen, systemische Ungleichheiten im Rahmen von Klimaanpassungspolitik zu adressieren. In der Praxis dominieren jedoch inkrementelle Anpassungsmaßnahmen, insbesondere wenn es um vulnerable Bevölkerungsgruppen geht. Deutschland steht exemplarisch für diese Spannungen. Wenig untersucht sind bisher die größeren Kontextfaktoren, die die Beseitigung der Grundursachen von Verwundbarkeit verhindern, wie man den Übergang weg von inkrementellen Maßnahmen gestalten kann und welche Rolle Umweltbehörden dabei spielen können. Der Artikel wendet eine historisch-materialistische Policyanalyse an, und untersucht in einem dreistufigen Ansatz, Kontext, Akteure und Politikprozesse. Die Kontextanalyse zeigt auf, wie wirksame Mittel zur sozialen Umverteilung seit Mitte der 1980er-Jahre im kapitalistischen Sozialstaat Deutschland reduziert wurden. Dies korreliert mit einer erhöhten sozialen Verwundbarkeit gegenüber dem Klimawandel. Die Akteurslandschaft diversifiziert sich. Bisher unterrepräsentierte sozialpolitische Akteure und Aufgaben gewinnen an Bedeutung. Der politische Prozess deutet auf eine stärkere Fokussierung auf vulnerable Bevölkerungsgruppen hin. Dennoch sind sowohl Verständnis der strukturellen Grundursachen menschlicher Vulnerabilität als auch finanzielle Ressourcen des Politikfeldes äußerst begrenzt. Entsprechend sind die Instrumente weitgehend informativ und mit nur flacher Eingriffstiefe, die nicht ausreichen wird um Vulnerabilität an der Wurzel zu adressieren. Eine verbesserte Ursachenanalyse gepaart mit neuen Allianzen und Policy-Mixes sind gute Ausgangspunkte für mehr soziale Gerechtigkeit in der Klimaanpassung.

Schlüsselwörter Historisch Materialistische Policy Analyse · Soziale Gerechtigkeit · Klimawandelanpassung · Policymaking · Transformative Anpassung · Vulnerable Bevölkerungsgruppen

A>Z

AAP	Adaptation Action Plan
BBK	Federal Office of Civil Protection and Disaster Assistance
BMAS	Federal Ministry of Labour and Social Affairs
BMI	Federal Ministry of the Interior and Community
BMG	Federal Ministry of Health
BMUV	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
BMWK	Federal Ministry for Economic Affairs and Climate Action
BMWSW	Federal Ministry for Housing, Urban Development and Building
CCA	Climate Change Adaptation
CPA	Critical Policy Analysis
NAS	German National Adaptation Strategy
DWD	German Weather Service
HMPA	Historical Materialist Policy Analysis

IPCC	Intergovernmental Panel on Climate Change
IMAA	Interministerial Working Group on Adaptation to Climate Change of the German Federal Government
KOMPASS	Competence Center Climate Impacts and Adaptation
VA	Vulnerability Assessment
UBA	German Environment Agency
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

More rapidly intensifying climate change across the world interacts with poverty and inequality in multifaceted ways (e.g., Olsson et al. 2014; IPCC 2022a). Accordingly, adaptation decisionmakers are increasingly confronted with the demand for holistic adaptation responses and addressing systemic injustices as part of climate adaptation (e.g., Berrang-Ford et al. 2021; Juhola et al. 2022; IPCC 2022a; Cairney et al. 2023; Strange et al. 2024). Most of these demands are discussed under the umbrella of “transformative adaptation,” understood as a more systemic form of change that addresses the root causes of vulnerability and breaks with status quo pathways that recreate and/or worsen existing vulnerabilities (e.g., Ribot 2011, 2014; Fedele et al. 2019; Thomas and Warner 2019; Ajulo et al. 2020; Taylor et al. 2022). Transformative adaptation responses entail more profound changes for greater environmental and human well-being by attending to the broader set of stressors people face (Orlove 2010; Tschakert et al. 2013). This implies making transparent and redefining the underlying social structures and power relations that reproduce vulnerability in addition to asking a broader set of political economy questions (Taylor 2014; Eriksen et al. 2015; Warner and Kuzdas 2017).

Incremental adaptations are contrasted from that and refer to reactive and/or minor adjustments that do not lead to a change in status-quo developments and/or power relations, some of which reproduce or worsen vulnerability. Examples include cooling shelters during periods of extreme heat, vaccinating against newly emerging climate-sensitive diseases such as Dengue fever or suppressing forest fires (also see Kates et al. 2012). Incremental adaptations can be understood as (preliminary) remedies to problems that are often more deeply rooted. Aside from the ever-growing demands for transformative adaptation, incremental adaptation responses are the norm with little evidence of transformative adaptation (e.g., Huitema et al. 2016; Berrang-Ford et al. 2021; UNEP 2022). Though there is some discussion of large landscape modifications such as greening the built environment constituting transformative adaptation (e.g., Scolobig et al. 2023), the lack thereof is especially pertinent when it comes to addressing the root causes of vulnerability as they refer to addressing the underlying stressors people face.

Germany is exemplary of these tensions: With an annual mean temperature of 1.7 degrees Celsius, the country has warmed above global average (e.g., Kahlenborn et al. 2021; DWD 2023). The most recent climate impact and risk assessment 2021 for Germany demonstrates that the assessed risk has increased for almost half of the climate impacts and action fields (Kahlenborn et al. 2021). Simultaneously,

different forms of inequality are a dominant context factor in Germany as well, which impacts effective adaptation responses that aim to address vulnerable populations. This includes (rising) financial inequalities such as increased risks of poverty, or staggering wealth, and income inequality, in addition to political inequality (i.e., lower access to decision-making), cultural inequality (e.g., gender disparities) and environmental inequality (i.e., limited access to green and open spaces) (also see bpb 2021 or Brülle and Spannagel 2023). Aside from lacking an understanding of how these often interdependent dimensions of inequality interact with climate change and impact people's vulnerability (also see Teebken and Schipperges 2024), climate justice and social implications of climate change impacts and adaptation measures were not much of a concern of Germany's past adaptation efforts (e.g., Vetter et al. 2017, 2023; Bruns and Fünfgeld 2021; Bohnenberger 2022). However, the effectiveness of adaptation relies on integrated and multi-sectoral solutions that address social inequities (e.g., IPCC 2022a).

The article seeks to respond to the following research question: what are the opportunities and limitations for addressing systemic injustices as part of adaptation policymaking? To assess opportunities and limitations for addressing vulnerable populations as part of strategic adaptation planning at the national level, the article examines the larger political economic context against which adaptation policymaking unfolds, that structures the preconditions of uneven population vulnerability in the sense of their entitlements to material resources. Further, the article investigates key political actors (and social forces) involved in adaptation policymaking and reflects upon the extent to which vulnerable populations are currently addressed in recent public adaptation efforts. The next section briefly revisits central concepts as well as the state of research on vulnerable populations and adaptation policymaking. Thereafter, Historical Materialist Policy Analysis (HMPA) is presented as main methodological and theoretical framework, which follows a three-step analysis of context, actors, and processes in the results section. The last section discusses the findings in terms of what they mean for future research and practice for a socially just adaptation policy.

2 State of the art: Aspirational transformative adaptation

Making vulnerable populations a front-and-center concern has been at the heart of climate justice driven discourses on transformative adaptation (e.g., Ribot 2011; Tschakert et al. 2013; Juhola et al. 2022; Ajulo et al. 2020). In this context, concepts that are used interchangeably are “systemic injustices,” “inequality” and “root causes of vulnerability.” The Intergovernmental Panel on Climate Change (IPCC) characterizes inequality as “uneven opportunities and social positions, and processes of discrimination within a group or society, based on gender, class, ethnicity, age, and (dis)ability, often produced by uneven development,” (IPCC 2022b: 1801). Interpretations of the root causes of vulnerability hint at social, cultural, economic, and power relations (Fedele et al. 2019) and aspects such as structural inequities and gendered disadvantages (UNEP 2022). Watts and Bohle (1993) point to the political nature of vulnerability as a process of (dis)enfranchisement determined by the

command over resources and the distribution of entitlements. Vulnerability entails to not only locate the causes of damage within the climate but demands attention for existing social pre-conditions and root causes at multiple scales, including local and distant social, political, and economic causes (Ribot 2014). The article follows this understanding of transformative adaptation as addressing the uneven access to basic material resources that structure the social pre-conditions with which people can prepare for, react to and recover from intensifying climate change.

In policy-oriented reports and practice, the demand for climate adaptation to address inequality has also become more pronounced (e.g., EEA 2022; Taylor et al. 2022; IPCC 2022a). The last IPCC Assessment Report put a special emphasis on climate justice concerns emphasizing “vulnerability at different spatial scales is exacerbated by inequity and marginalization linked to gender, ethnicity, low income or combinations thereof,” (IPCC 2022c, p. 17). There is no unified definition of transformative adaptation and how it relates to justice. However, the bottom line is: Without social justice, there will be no transformative adaptation (also see Tschakert et al. 2013) and without addressing the non-climatic factors which contribute to vulnerability, the feasibility and effectiveness of adaptation will be severely hampered (also see Olsson et al. 2014; IPCC 2022a,c).

Against this background, practitioners are increasingly exploring how to implement justice-oriented climate policy approaches and make vulnerable populations a front and center concern (e.g., Brousseau 2023; Diezmartínez and Gianotti 2022; Freistaat Thüringen 2022; Strange et al. 2024). However, first assessments find, that while the increasing attention to justice is promising, much remains in the planning stage, and greater guidance for implementation is needed, in addition to lacking concrete strategies for operationalizing justice on the ground (Chu and Cannon 2021; Diezmartínez and Gianotti 2022). Further, climate adaptation planning is signified by an articulation of sector-specific justice concerns as well as specific aspects of justice, which often remain aspirational and/or in the early stages of implementation (Brousseau 2023; Diezmartínez and Gianotti 2022). More studies are needed to examine the transition from planning to action, which is one central gap the article aims to address. In contrast to other countries such as the United States, the explicit focus on vulnerable populations as part of climate adaptation planning and policymaking is rather novel in Germany.

Critical environmental justice scholarship has hinted at environmental decision-makers being generally disconnected from justice (also see Gross 2014; Kennedy 2017). There is a stark disconnect between theoretical demands and actual adaptation practice, which is partially the outcome of different epistemic traditions, and justice-oriented research or recommendations often being disconnected from discussions on policy processes and design. Especially, there is a lack of understanding of the opportunities and limitations for incorporating inequality concerns into adaptation policymaking (Cairney et al. 2023). Little is known as to which role environmental policy practitioners can play in this. This is the second gap; the article seeks to address. Lastly, and in line with the recent critique on the little meaningful engagement of climate justice discourses with policy theories (Cairney et al. 2023), this article aims to grow a better understanding of how policymaking actually works by reflect-

ing upon some of the structuring context conditions for (adaptation) policymaking on vulnerable populations.

3 HMPA as methodological framework and theoretical inquiry to study policy inertia

HMPA is an emerging strand of research and method that is nestled in critical policy analysis (CPA). CPA questions the adequacy of conventional tools of policy analysis for problems of global change (Morgan et al. 1999). CPA does not share some of the main assumptions of conventional policy analysis, such as there being a single public-sector decision-maker, who faces a single problem of a single polity. CPA also questions that uncertainty of policy decisions is modest and manageable, or that systems under study can be treated in a linear fashion (Morgan et al. 1999). CPA and HMPA are especially interested in the intricate contestation and inertia which structure policy responses to crises (Brand 2013; Brand et al. 2022). Climate adaptation policy is criticized for being techno-managerial and “taking a wait-and-see approach,” globally and in Germany in particular (e.g., Eriksen et al. 2015; Huitema et al. 2016; Remling 2019, 2023). HMPA appears particularly well-equipped to examine the persistence of adaptation incrementalism regarding vulnerable populations, as it aims to make transparent the power relations behind technocratic procedures (Forschungsgruppe ‘Staatsprojekt Europa’ 2014). HMPA embraces policy processes as inherently complex and situates them in the broader political economy. It pays closer attention to the modes of material reproduction.¹ This corresponds with demands by adaptation scholars to consider specific social structures and processes that support economic hegemony (e.g., Warner and Kuzdas 2017). How vulnerable populations and inequalities are being reproduced at multiple scales is something that most adaptation policy studies lack (Ribot 2011, 2014). Understanding the multicausal structure of specific vulnerabilities is important to identify the multiple scales at which solutions must be developed (Ribot 2011).

HMPA is materialistic in that it positions the material and social interests in the context of manifold social conditions, class relations, and nature-society relations. HMPA is historical in that it situates policies within historically grown nature-society relations and as the result of past policy compromises. HMPA focuses on how specific policies are formulated against the background of competing interests of different social forces and power relations (Schneider et al. 2023). Thereby it provides a complex understanding of the policy process, which Cairney et al. (2023) criticized is lacking in climate justice studies and their tendency of treating policymaking like a “black box” (Cairney et al. 2023). HMPA is especially helpful to examine how policymaking *actually works* regarding the production of climate justice, as it touches upon different elements which impact (justice-oriented) policymaking such as larger context conditions, actor constellations, but also distinctive characteristics of the policy process itself.

¹ Due to scope, please see Schneider et al. (2023, p. 112ff.) for a more detailed understanding of the theoretical underpinnings, and how HMPA is different from other critical policy studies.

Since its introduction by Brand (2013), HMPA has been applied to several empirical cases such as European migration politics, the energy transition in Germany and Spain, or EU climate policy (Research group 'State Project Europe' 2014; Haas 2017; Kannankulam and Georgi 2014; Schneider et al. 2023). HMPA was continuously advanced to make the approach more palpable for empirical research. It essentially consists of a three-step process of context, actors and process analysis suggested by Kannankulam and Georgi (2014), and applied amongst others by Haas (2017), and Schneider et al. (2023). Thereby, it offers a systematic framework of analysis to increase our understanding of how *policy* (material dimension of politics, specific solutions) is influenced by *politics* (procedural aspects, power, interests), *polity* (institutional system, actors) and vice versa.

The context analysis aims to reconstruct the historical situation of the *specific empirical conflict* under analysis of HMPA, by looking at how "social and political forces reacted differently and in opposition to each other," (Kannankulam and Georgi 2014, p. 63). It should therefore be shown how the conflict acts in relation to fundamental contradictions and crisis tendencies or discloses them (Lenikus et al. 2022). The context analysis reflects upon the political economic context conditions or the conditions of the (re)production of social conditions (Haas 2017). The specific empirical conflict under study in this article is adaptation policy incrementalism as it relates to vulnerable populations, and the root causes of inequality reproduction, which remain largely unaddressed in existing policy responses.

The second step maps the institutional terrain of the state by identifying relevant and conflicting actors (Kannankulam and Georgi 2014; Haas 2017). The actors themselves and their specific capacities, objectives and rationales are situated within the historical situation. The hegemony concept is very central to the study of actors under HMPA. Due to scope, the wide range of actors involved in climate adaptation governance and the institutional responsibility for climate adaptation diversifying at the moment, this part remains underdeveloped and can only offer a cursory overview of key actors and their status. Looking at how these different actors relate to the conflict and which hegemonic projects can be identified must be the target of a follow-up study. Thereby, the politics component of the analysis is admittedly underdeveloped.

Building on the context and actor analysis, the final part of HMPA studies the immediate policy process, key incidents and concrete decisions in which actors had to position themselves and/or how actors attempted or were able to generalize their interests into public policies (Haas 2017; Lenikus et al. 2022). Of specific interest are turning points and important conflicts across different stages of the policy process. The Ahr Valley flooding in 2021 resulted in heightened political attention. In November 2023 the National Adaptation Law was adopted. This marks an important turning point for the analysis of actors and process.

HMPA helps to map which elements need to be included in a comprehensive analysis of climate change adaptation (CCA) policy and the environment in which policymaking is embedded. Doing HMPA involves inductive and deductive moments by making use of empirical material and working through existing concepts and theories (Brand et al. 2022). In line with Haas (2017) who applied HMPA to the energy transition, the context analysis draws from comparative capitalism research and (critical) political economy studies to detect central structural features

and development dynamics in Germany. This literature body was complemented by literature on social stratification and inequality as existing comparative capitalism and (critical) political economy research has limited insights to offer regarding the characteristics of inequality. Yet, these are central to understand (the reproduction and context conditions of) vulnerable populations and how they can and cannot be addressed as part of climate adaptation policy. The primary data includes key strategic documents and grey literature, such as climate risk assessments, adaptation policy plans, progress reports, and political hearings on the national adaptation law (2023). The primary data was used for the analysis of actors and processes. The primary data was then analyzed regarding 1) problem recognition about vulnerable populations and 2) concrete policy instruments to address them (for an overview of analyzed documents, see appendix 1).

The analysis of actors and tensions relies on an initial assessment of key tasks and responsibilities as they pertain to the central strategic policy efforts regarding climate adaptation. Because adaptation is a cross-cutting task and includes actors across the horizontal and vertical spectrum, this step of the analysis must be considered preliminary upon which a subsequent analysis must be built. Due to ongoing political shifts such as the preparation for a federal climate adaptation law (2023/2024) and the preparation of an anticipatory adaptation strategy (2025), the further collection of primary data in form of interviews with relevant ministries, political parties and the growing number of social actors is a necessary next step that is beyond the scope of this article. These interviews will offer insights on core conflicts, different interests, and power relations and how they impact(ed) adaptation policymaking at the nexus of justice.

4 Results

4.1 Context: Germany, a capitalist welfare state that reproduces inequality

The political economic “German model” used to be described as an advanced form of capitalism characterized by an “institutionalized high-wage economy combining high competitiveness in world markets with strong social cohesion,” (Streeck 1995, p. 2). Initially capitalism in Germany contained a unique set of social-economic institutions such as socially instituted and circumscribed markets but also widespread associational self-governance by organized groups in civil society (ibid.). The institutional framework consisted of politically instituted and socially regulated markets, with public policy serving “public purposes” such as healthcare, education, social insurance (Streeck 1997, p. 7). Back in the late 1990s, Streeck (1997) postulated that these areas of social life are not governed by market principles. The German variant of capitalism was viewed as a relatively successful combination of economic dynamism and relatively little inequality at multiple scales (also see Streeck 1995; Lehndorff 2012).

Over the past 30 years, the capitalist political economy systematically transformed, resulting in a highly selective process of welfare and prosperity gains (e.g., see Bude and Staab 2016). This not only regards growing tensions due to exploita-

tive patterns based on an externalization of environmental and social costs to the Global South, but also systematic effects of highly financialized economies on social inequality in Germany (*ibid.*). The decline in well-paid types of employment in the industrial sector, and replacement through a service proletariat that is supported by the welfare state, in addition to cross-border commuters and various forms of marginal employment in the industrial sector are some of the signifiers (see *ibid.*). While labor productivity increased, and although the nominal wage was 60.7% between 1991 and 2019, real wages only rose by 12.3% during the same period (bpb 2022). The result is that gains in income and wealth have been marginal for those who more strongly depend on it, and people having generally less than they had in 2000 (*ibid.*). This drastically affects the nowadays more limited access to basic materialistic goods and services such as food, energy, and affordable housing, which are argued to constitute some of the root causes of vulnerability to climate change (e.g., see Bohle et al. 1994; Thomas and Warner 2019; Thomas et al. 2018).

In hindsight, Streeck (2014) writes, “the legitimacy of postwar democracy was based on the premise, that states had a capacity to intervene in markets and correct their outcomes in the interests of citizens. Decades of rising inequality have cast doubt on this [...]” (p. 41). Economic inequality of both income and wealth are one of these crisis symptoms that has been on the ascent for decades, in addition to welfare-state cutbacks (see Streeck 2014). Buggeln (2022) examines the history of taxes in Germany and their role for mitigating social (in)equality. After a period of heightened equality under socio-liberal governmentality until the mid-1970s, neoliberal governance took over and with it a changing taxation regime. Taxation of high incomes and wealth was greatly reduced since the mid-1980s, leading to a sharp rise in income inequality.

Between 1998 and 2015, the progressive and redistributive effects of the German tax system have further declined (Bach et al. 2016). Poorer households are carrying a much greater burden, than upper-income households, which received income tax and corporate taxes reliefs (*ibid.*). Taxation in Germany changed fundamentally, by for instance expanding individual consumption taxes, while reducing tax burdens for high incomes, and reducing companies and capital income tax rates in addition to abandoning the wealth tax in 1997 (also see Buggeln 2022). Despite the direct effects for social equality, the neoliberal paradigm also had an influence on the state's (declining) ability to act, especially when it comes to addressing the root causes of vulnerability to climate change.

For Buggeln (2022), the re-introduction of a wealth tax, the consolidation of an inheritance tax and a financial market transaction tax are among the central levers for addressing rising social inequality in Germany. Recent parliamentary debates around the Poverty and Wealth Report of the Federal Government (Deutscher Bundestag 2021) and concrete party-driven recommendations to address inequality, however, make visible, how socially contested this arena is. Besides being interlinked with many core concerns as discussed by transformative adaptation scholars, this policy arena and its synergies for climate adaptation policymaking are unexplored, not just when it comes to relevant policy instruments, but also regarding (new) actor constellations (see subsequent sections).

4.2 Actors: Diversifying actor landscape but underrepresentation of social actors

4.2.1 *Climate adaptation as shared responsibility*

Due to the multi-level system, different levels of government at horizontal and vertical scales are engaged in the governance of adaptation in Germany.² Climate adaptation is generally considered a shared responsibility between the federal, state, and local governments (also known as “subsidiarity principle”) (e.g., Vetter et al. 2017). At the horizontal national level, the environmental agencies, the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and Federal Ministry for Economic Affairs and Climate Action (BMWK) are primary policymaking bodies. The BMWK is responsible in engaging in multilateral, international processes and implementing resolutions of international climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), e.g., aligning Germany’s climate policies in compliance with targets set forth under the Paris Agreement and representing Germany at international climate conferences.

The BMUV is the central federal-level actor involved in (advancing) the development of Germany’s domestic adaptation efforts such as the National Climate Adaptation Strategy (NAS), the development of a climate adaptation law and the “anchoring of joint financing by the federal and state governments” (BMUV n.d.). The German Environment Agency (UBA) is a subordinate environmental authority and key actor, scientifically grounding Germany’s adaptation efforts. Within the UBA, the Competence Center Climate Impacts and Adaptation (KOMPASS) was created with the key tasks to 1) provide political advice and advancing the National Adaptation Strategy (NAS), 2) designing, funding, and coordinating different consultancy and research projects, 3) developing and providing audience specific information, as well as 4) enabling networking and participation around climate adaptation issues (UBA n.d.).

4.2.2 *Environmental agencies as central actors*

Federal environmental agencies and subordinate environmental authorities have been the core actors pushing the horizontal integration of climate adaptation into the responsible federal ministries. Because climate adaptation is a cross-sectoral task, other federal agencies, such as the Federal Ministry of Health (BMG) are becoming more proactive at integrating climate adaptation concerns into their respective arenas. The Ministry of Work and Social Affairs (BMAS) used to play an only subordinate role in the past but is likewise becoming more important regarding oc-

² The European Union (EU) is becoming increasingly important in light of new policy efforts, such as the second EU Climate Adaptation Strategy being published in 2021 or the European Climate Law (2021), which renders policy efforts Member States have to undertake, such as comprehensive national adaptation strategies. The nexus of EU vis-à-vis German adaptation policymaking is beyond the scope of this article but marks a prime area for further research.

cupational safety and health. The Federal Ministry for Housing, Urban Development and Building (BMWSW) is also playing a growing role with a focus on climate-friendly urban development through funding efforts to green public spaces, unsealing and strengthening biodiversity (BMWSW 2023). The Federal Office of Civil Protection and Disaster Assistance (BBK) is another important actor at the federal level, whose role is becoming significantly more important in the wake of increasing extreme events and multiple hazards situations, as the Ahr Valley flooding has shown. The BBK is anchored in the Federal Ministry of the Interior, Building and Community (BMI).

Federal ministries work together in the Interministerial Working Group on Climate Adaptation (IMAA) under the leadership of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUV). As part of their IMAA work, ministries are informing each other about their activities to enable effective climate adaptation in Germany. The work of IMAA has been described as “negative coordination” because the lead department plays the key role in shaping the content and adaptation policy processes which are characterized by selective perceptions and singular departmental interests (Hustedt 2014). In addition, IMAA founded the Climate Change Adaptation and Authority Network (“Strategische Behördenallianz Klimawandel und Anpassung”) which since 2007 and under guidance of the BMUV/UBA, supports the implementation of the National Adaptation Strategy through the development and coordination of scientific content in the reporting obligations for the NAS. The network has steadily grown, with 28 federal networks and institutions represented in the network (BMUV 2020).

4.2.3 Underrepresentation of social policy actors but a diversifying actor landscape

In the past there were departments, which had relatively few measures as part of Adaptation Action Plans (AAPs). BMAS for instance, was not undertaking deliberate adaptation interventions (also see Gaus et al. 2019). As climate adaptation is being elevated politically with the recent adaptation law and impacts are becoming more virulent across sectors, the actor landscape and responsibilities are diversifying. In the third AAP, BMAS proposes two public health adaptation measures i.e., on occupational healthcare and providing information and tools for training and educating employers and employees on the matter (BMUV 2020). This shift will further solidify as a result of the federal adaptation law, that established “vulnerable populations or labor” as a new sector that cuts across all sectors. Here, BMAS will become a more central actor that can be expected to take on responsibilities related to social and labor policy issues. In addition to governmental actors, adaptation used to be a policy field, that did not enjoy much vetting by actors other than environmental entities. With the federal climate adaptation law, this too changed with different private and non-state actors, as well as professional associations (“Spitzenverbände”) being represented, some of which advocated for socially just adaptation climate adaptation politics.

4.2.4 *The role of political parties*

In the wake of the Ahr Valley flooding and increasing adaptation policy measures, such as the federal adaptation law, political parties are waking up to the topic of climate change adaptation as well. In November 2023, the German Bundestag passed the Federal Climate Adaptation Act which obliges the federal government, federal states, and municipalities to conduct climate risk assessments and develop precautionary climate adaptation strategies (Deutscher Bundestag 2023a). The law was an integral part of the coalition agreement between the Social Democrats (SPD), the Green Party (B90/Grüne) and the Federal Liberals (FDP). It is considered the most important legislative project that will result in further deepening and differentiating the legal basis of climate adaptation law (Saurer 2022). The law gained majority votes from the Social Democrats, the Green Party, the Federal Liberals and was opposed by the Christian Democrats (CDU/CSU), the Alternative for Germany (AFD) and abstention of Die Linke. Because the state translates the latent interests of social forces into specific policies (also see Schneider et al. 2023) and political motivations can shape the intensity of policy reforms, political ideology and party positions are important to reflect upon. This regards not just adaptation policy integration (also see Biesbroek 2021), but likewise the pursuit of integrating social justice in adaptation policy. How political parties influence adaptation policymaking is understudied, also because they have not played much of a role in the past. Their role for voting against tax reforms that act as levers for social redistribution must be likewise examined. Parliamentary debates around the Ahr Valley flooding and the federal adaptation law demonstrated, how the AFD is pitting different policy arenas against each other (such as disaster risk reduction and climate adaptation), and the role parties can play in blocking certain political reform processes. The same holds true for parliamentary debates on tax reforms. It is important to consider how these parties receive majority votes, and thereby become major social forces that will structure adaptation policymaking at different government levels in the future.

4.3 **Process: Continued incrementalism as it pertains to a socially just adaptation policy**

In the early days of public adaptation planning in Europe, Germany was considered an adaptation leader characterized by early policy development and adaptation activities (Biesbroek et al. 2010; Massey et al. 2015). In 2008, the German government approved the first National German Adaptation Strategy (NAS). In the early to mid-2010s, adaptation was considered a new and relatively young policy field (Daschkeit 2012; Stecker 2015). Since then, the policy field has significantly advanced, with adaptation being mainstreamed across policy sectors and many policy instruments being developed and deployed (e.g., Vetter et al. 2017; Weiland 2016). It is now considered an established policy field (Vetter et al. 2023). Governmental and non-governmental social groups are involved in the strategy process but to date without a clear strategic approach how non-state actors can be involved in decision-making and “be activated for their own precautions,” (Vetter et al. 2023, p. 485). Fundamen-

tal challenges remain with social justice in adapting to climate change being hardly addressed (*ibid.*).

In contrast to other countries, such as the United States, where national climate policy efforts stand and fall with new administrations, German adaptation planning is considered a permanent task (“Daueraufgabe”). The National Adaptation strategy has been supported by regular vulnerability and risk assessments (2005, 2015, 2021), action plans (2011, 2015, 2020), progress and monitoring reports (2015, 2019, 2020) as well as evaluations (2019) (see appendix 1). The corresponding Adaptation Action Plans (AAPs) provide insights into policy approaches and instruments that are currently in use. Climate change adaptation is implemented through integration into different fields of action (“adaptation mainstreaming”) in addition to horizontal integration through sector policies (e.g., in the fields of land use planning, health, or water).

4.3.1 Limited understanding of structural vulnerability drivers based on proximate root cause analysis

Recent public adaptation planning in Germany is beginning to consider vulnerable populations more centrally. Vulnerability risk assessments are the central instrument to examine human and environmental vulnerability, to then design concrete policy interventions. Accordingly, their problem understanding carries important political implications. The most recent climate risk assessment focuses on the proximate factors of risk and vulnerability by mainly examining the economic and environmental aspects of vulnerability. The assessment is divided into six sub reports that study climate risks across different NAS clusters (land, water, infrastructure, economy, and health) in addition to a basic report at the beginning and an integrated assessment at the end. Though the basic report lays out the methods for the analysis of subsystems, which included guiding questions such as: *who* or *what* is affected? (Kahlenborn et al. 2021) the subsequent analysis ends up mainly focusing on *what* is affected (rather than *who* or *why*). Vulnerable populations are a sidelined concern with a continued focus on regions and systems. Vulnerable populations are briefly mentioned in the public health context, “such as children, the elderly, and people with diseases,” (Wolf et al. 2021, p. 168). Further the focus is based on describing individual indicators, socio-economic and demographic characteristics (e.g., age, gender, economic and educational background). A profound root cause analysis is lacking.

Given that the evaluation of National Adaptation Strategy advocates for a broader anchoring of climate change in society and a consideration of social aspects and adaptation justice concerns (BMUV 2020), the limited understanding of population vulnerability in the 2021 national climate risk analysis is surprising. The government agency network, and the expertise of the individual departments represented therein, significantly contributed to the analysis (Kahlenborn et al. 2021). Aside from pooling relevant adaptation knowledge from various sectors, the role of social and welfare organizations and non-expert knowledge appears to be underrepresented. Further research is needed to support this initial impression. Overall, the risk assessments continue to locate the causes of damage within the climate and partially

the individual but fail to reflect upon the political nature of vulnerability and how material resources are distributed in society. This, however, is an important precondition when pursuing transformative adaptation. There appears to be a lack of understanding how certain structures are being reproduced by political institutions, and at what level. This supports earlier observations by revealing an insufficiently developed understanding of the socio-political dimensions of climate change impacts and vulnerable populations (see Remling 2019, 2023).

Vulnerable populations are anecdotally addressed as part of different consultancy projects, such as a study commissioned by the BMG to identify care and support needs of vulnerable groups (Hackmann et al. 2018). Three vulnerable groups and overlapping vulnerabilities are identified: 1) elderly with a migration background in need of care, 2) elderly in need of care living by themselves and in risk of poverty, and 3) disabled elderly with special mental needs in need of care. The study notes that it is a basic research project to provide an initial overview of specialized demands for these groups.

Another study commissioned by BMAS examined the distributional effects of climate change and which groups are more affected (Beermann et al. 2021). The distributional impacts are considered to affect certain “households that are affected by damage and the need for adaptation are counted in groups are particularly affected by the associated cost or price increases. e.g., on tenants, recipients of social benefits recipients, single parents, retirees, students, people with health problems, restrictions, or older citizens,” (Beermann et al. 2021, p. 18 f.). What is problematic here too is that these studies often only inadequately hint to locating vulnerability in the political economic context. The result is short-sided policy implications.

A very common pattern in climate adaptation policymaking is the outsourcing of expertise, also when it comes to root cause analysis, with academic actors and consultancy agencies playing an important role in that they provide policy advice for different governmental agencies but are also themselves part of transdisciplinary research-into-use projects. Bruns and Fünfgeld (2021) have problematized that climate scientists are increasingly becoming service providers because authorities are lacking specialist and experiential knowledge about climate change. As a result, policymakers are increasingly occupying a role of “customers, that are purchasing expertise,” (ibid., p. 236).

A limited understanding of the root causes which make people vulnerable also becomes visible in the federal adaptation law. Although the law stipulates, that German adaptation efforts must ensure that inequalities are not deepened by climate change (Deutscher Bundestag 2023a), it applies a mainstream understanding of vulnerable populations prevalent in public health by only mentioning women, children, older and sick people as well as disabled people, as those who are “in particular need of protection,” (p. 15). At the same time, the protection of vulnerable populations is elevated by establishing “vulnerable groups or occupational safety” as a new cluster for Germany’s adaptation strategy (Deutscher Bundestag 2023b). What this will entail, remains to be seen. In its current form, major economic paradigms that result in vulnerability co-creation are not reconsidered.

4.3.2 *Project-bound nature of adaptation and financial gaps*

Many adaptation processes are project-bound, which has resulted in the constant exploration of new funding directives and contract research as indispensable elements for climate adaptation governance. To date, many adaptation efforts in support of the local level appear to be ad-hoc such as the Immediate Climate Adaptation Program (2022) that was a response to the Ahr Valley Flooding in 2021. In there, the aspiration for comprehensive financing is formulated to “move away from model projects and towards regular tasks,” (Deutscher Bundestag 2023c). Yet, the lack of a political majority and will to do so appear to be a major stumbling stone in the current administration.

In light of the federal adaptation law, the financial gap for adaptation is looming large: the Federal Government estimates the annual costs at 2.75 million Euro in addition to one-off costs of 16.5 million Euro (Deutscher Bundestag 2023a). It is not specified at this stage how much the individual departments will receive of the latter sum. The annual costs for federal states are estimated between 830,000 and 1.67 million Euro in addition to one-time costs for developing climate adaptation concepts and strategies (ibid.). Municipalities are now likewise obliged to develop climate adaptation concepts. This regards 400 districts and 10,786 municipalities, out of which 15 to 20% are estimated to already have developed climate adaptation concepts, which do not need to create climate adaptation concepts again (ibid.). Based on this estimate, the one-time cost is calculated at 956,810,000 million Euro.

At an Environment Committee hearing, experts had criticized the uncertainty associated with financing, which they did not consider implementable through present funding programs (Deutscher Bundestag 2023a). Experts considered it problematic that the adaptation law and stipulated financing therein only pertains to the conceptualization of adaptation measures, not their actual implementation. The estimated costs for climate adaptation measures beyond vulnerability risk assessments and adaptation planning are considered much higher. Accordingly, most experts advocated for establishing CCA as a joint task to be anchored in the constitution, to legally enable mixed and more adequate financing by the federal level and state governments (ibid.). The latter are currently the main actor responsible for covering municipal costs but handle cost coverage differently according to the state constitutions. There is a substantial gap between the adaptation measures that are scientifically argued for; aspirational targets as set forth by the federal adaptation law and the financial resources provided. This gap is widening as a result of the recent decision by the Federal Court of Justice which ruled against the transfer of the remaining Covid-budget (“Nachtragshaushalt”) in the amount of 60 billion Euro substantially funding climate policy. The appeal was an effort by members of the CDU/CSU. Many adaptation measures are affected such as the “action program for natural climate protection,” in height of 983 million Euro (BMWSB 2023). This is another instance of parties interfering with the way climate (adaptation) policy can(not) be implemented.

4.3.3 Dominance of informatory instruments

In their analysis of policy instruments applied in the German adaptation context, Vetter et al. (2017) differentiate the range of policy instruments into formal instruments (e.g., binding laws and regulations), informal instruments (information, participation, cooperation), economic instruments (price-based steering mechanisms), and organizational development (long-term inclusion of different actors in decision-making and implementation processes through institutionalized processes). When applied to the analysis of how vulnerable groups are currently being addressed, and although regulatory mainstreaming of climate adaptation has become significantly more advanced as part of technical laws, policy instruments are mainly informatory. These include creating audience-specific information or heat warning systems for vulnerable populations (e.g., BMUV 2020; Deutscher Bundestag 2023). With the mandated establishment of “vulnerable groups or occupational safety,” as an additional cluster in the NAS, the protection of vulnerable groups through respective laws in the sectors of public health, and industry and commerce will gain importance. This will especially concern people who engage in intensive physical labor outdoors, and need special protection (e.g., occupations in the construction industry, agriculture, and the service sector). In its current form however, this appears to follow an economic rationality, in the sense of effective labor productivity. This needs further investigation. As part of Germany’s current efforts to articulate an anticipatory adaptation strategy, the IMAA is working on establishing indicators to measure adaptation success across sectors. This was partially done through inviting participation of associations, federal states, municipal umbrella associations and the scientific community to identify measurable climate adaptation goals along the NAS clusters. For the field of action “Social Justice in Climate Adaptation” no specific targets are intended. Instead, priorities are being formulated that are to be pursued across departments. These, however, appear to be aspirational rather than legally binding commitments to social justice.

5 Discussion: Toning down expectations to “produce” transformative adaptation

In light of growing calls for transformative responses that jointly address multiple crises of rapidly intensifying climate change and rising inequality, the article examined why adaptation policy inertia and incrementalism persist. The context analysis aims to reconstruct the historical situation of the *specific empirical conflict* under analysis of HMPA, by looking at how “social and political forces reacted differently and opposition to each other,” (Kannankulam and Georgie 2014, p. 63). Germany is a case in point, where climate change has been intensifying above global average and social justice was not much of a concern in the country’s national adaptation efforts. This marks the main empirical conflict under study: the rising demand for adaptation policy practitioners to address systemic inequality vis-à-vis persisting adaptation incrementalism, especially as it relates to addressing vulnerable populations. The article aimed to examine why this is the case and corresponding with three

research gaps, 1) enhance our understanding of some of the larger context factors which can impede the policy process. The methodological and theoretical framework of Historical Materialist Policy Analysis (HMPA) was applied by analyzing context, actors, and processes, 2) offer preliminary insights on how to transition out of adaptation incrementalism, and 3) reflect upon the role (environmental) policy practitioners can play in this regard.

On 1): the materialistic and social conditions are signified by a reproduction of different dimensions of inequality. Against the background of a capitalist political economy with diminishing social welfare structures, there is only so much that environmental policy practitioners can be expected to do in terms of “producing” transformative adaptation in the sense of implementing social justice through climate adaptation policy. Transformative adaptation discourses argue social justice is an important benchmark criterion for transformative adaptation (e.g., Tschakert et al. 2013). Examining the broader set of stressors people face is a prerequisite for adaptation responses to be effective (also see Orlove 2010; Warner and Kuzdas 2017). But as the context analysis showed, there are multiple social forces at play over which adaptation practitioners have only very limited influence. This includes the highly selective process of welfare and prosperity gains of the German capitalist model of development and a neoliberal taxation regime which impacts peoples' limited access to basic materialistic goods and services. This is what adaptation scholars consider “root causes of vulnerability” and HMPA researchers call modes of material production, social conditions and class-relations.

As earlier research showed, traces of neoliberal thinking can also be detected in Germany's adaptation approach based on a privatization of important public resources and the state leaving resolutions of public problems largely to the private sector (Huitema et al. 2016). The privatization of critical infrastructures falls into this category, with private enterprises postponing essential climate adaptation measures as their responsibility somewhat falls “between the cracks in the system,” (Schneider 2014, p. 9). Further, there is growing attempts to motivate citizens to strengthen private self-provisionary adaptation efforts as part of different consultancy projects (e.g., Siedschlag et al. 2023).

On 3): A look at adaptation policy processes and actors nevertheless revealed that there is a growing political interest in addressing vulnerable populations. Yet, concrete policy instruments are mainly of informatory nature, and will not reach deep enough. This is partially connected to a weak root-cause analysis prevalent in climate risk assessments and consultancy projects that have begun to assess the social dimensions of vulnerability and adaptation but have mainly focused on proximate explanations. Because of that, policy practitioners' understanding of the factors which make people vulnerable is underdeveloped. This in turn has implications for the policy instruments they will consider. Germany is not an exception—many countries are struggling to effectively address the root causes of vulnerability, with most justice-oriented approaches being at the early stages of planning (see Sect. 2). Juhola et al. (2022) propose an adaptation-justice index to support ex-ante adaptation planning. This index is helpful for adaptation policy-practitioners when designing adaptation planning to not worsen inequality through public adaptation efforts. Yet, the index itself offers little insights as to how to address the root causes of vulner-

ability. The above analysis also revealed that different power relations, competing interests and social forces play a role in the formulation of adaptation policy, e.g. an underrepresentation of social policy actors and non-expert knowledge or diverging political interests in how to finance the policy field and to what extent. Corresponding with research gap 2) on how to transition out of adaptation incrementalism as it regards vulnerable populations, the following section will outline some preliminary conclusions.

6 Conclusions: Forging new alliances, policy-mixes, and an improved root cause analytic

The central actors in charge of adaptation policy design used to be environmental agencies. As other governmental agencies are increasingly taking on adaptation tasks, strengthening holistic governance will become more important. Strengthening inter-organizational cooperations and forging new alliances, and (a more) systematic collaboration with unusual suspects such as the Ministry of Labour and Social Affairs (BMAS), and other labor, health and social welfare organizations appears to be a promising lever towards a pro-social adaptation policy. Another lever that needs further research is the design of new policy-mixes. Existing policy instruments to address vulnerable populations are largely informative. Classical instruments seeking to address social redistribution such as taxation of higher incomes, a capital gains tax, are worthy of attention in combination with the conventional adaptation toolbox (also see Teebken 2024). This must be investigated keeping in mind political majorities as well as competing social forces and power relations which structure the policy context. Before designing new policy bundles that integrate classical adaptation tasks with social justice instruments, one lever is a deeper understanding of the root causes of vulnerability. To date, the relevant assessments that inform policy choice continue to locate the causes of damage within the climate and certain socio-demographic and individual characteristics. Making transparent where, how and by whom vulnerability is reproduced in the political economy as part of vulnerability risk assessments can profoundly enhance practitioners' understanding of vulnerability and thus inform more in-depth policy instruments.

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References

- Ajulo, Oluwadunsin, Jason Von-Meding, and Patrick Tang. 2020. Upending the status quo through transformative adaptation: a systematic literature review. *Progress in Disaster Science* 6:100103. <https://doi.org/10.1016/j.pdisas.2020.100103>.
- Bach, Stefan, Martin Beznoska and Viktor Steiner. 2016. Who Bears the Tax Burden in Germany? Tax Structure Slightly Progressive, DIW Economic Bulletin, DIW Berlin, German Institute for Economic Research, vol. 6(51/52), pages 601–608.
- Beermann, A.-C., Schrems, I., Hünecke, K., Katja Schumacher, and Förster, H. (2021). Verteilungswirkungen eines fortschreitenden Klimawandels. Forum Ökologisch Soziale Marktwirtschaft (FÖS). https://foes.de/publikationen/2021/2021-09-FOES_Verteilungswirkungen_eines_fortschreitenden_Klimawandels.pdf. Accessed 10 Jun 2023.
- Berrang-Ford, Lea, A.R. Siders, Alexandra Lesnikowski, Alexandra Paige Fischer, Max W. Callaghan, Neal R. Haddaway, et al, 2021. A systematic global stocktake of evidence on human adaptation to climate change. *Nature Climate Change* 11(11):989–1000. <https://doi.org/10.1038/s41558-021-01170-y>.
- Biesbroek, G. Robbert, Rob J. Swart, Timothy R. Carter, Caroline Cowan, Thomas Henrichs, Hanna Mela, Michael D. Morecroft, and Daniela Rey. 2010. Europe adapts to climate change: comparing national adaptation strategies. *Glob Environ Chang* 20(3):440–450. <https://doi.org/10.1016/j.gloenvcha.2010.03.005>.
- Biesbroek, G. Robbert. 2021. Policy integration and climate change adaptation. *Current Opinion in Environmental Sustainability* 52:75–81. <https://doi.org/10.1016/j.cosust.2021.07.003>
- BMUV. Anpassung an den Klimawandel. <https://www.bmu.de/themen/klimaanpassung/ueberblick-klimaanpassung>. Accessed 5 Apr 2024.
- BMWSW. 2023. Bundesprogramm Anpassung urbaner Räume an den Klimawandel – Hohe Resonanz auf Projektauftrag. Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen.
- Bohle, Hans-Georg, Thomas Downing, and Michael Watts. 1994. Climate change and social vulnerability: Toward a sociology and geography of food insecurity. *Global Environmental Change-human and Policy Dimensions—GLOBAL ENVIRON CHANGE* 4:37–48.
- Bohnenberger, Katharina. 2022. *Klimasozialpolitik: Ein Forschungsstandbericht zur Verbindung von Klimapolitik und Sozialpolitik*. Vol. 3 Deutsches Institut für Interdisziplinäre Sozialforschung.
- bpb. 2021. Datenreport 2021: Ein Sozialbericht für die Bundesrepublik Deutschland. https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021.pdf?__blob=publicationFile. Accessed 5 Apr 2024.
- Brand, Ulrich. 2013. State, context and correspondence. Contours of a historical-materialist policy analysis. *Osterreichische Zeitschrift für Politikwissenschaft* 42:425–442.
- Brand, Ulrich, Mathias Krams, Valerie Lenikus, and Etienne Schneider. 2022. Contours of historical-materialist policy analysis. *Critical Policy Studies* 16(3):279–296. <https://doi.org/10.1080/19460171.2021.1947864>.
- Brousseau, Jennifer J. 2023. Exploring how social justice is considered in climate adaptation planning and implementation within local governments in the United States. Dissertation, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, United States. https://techworks.lib.vt.edu/bitstream/handle/10919/116456/Brousseau_JJ_D_2023.pdf?sequence=1&isAllowed=y. Accessed 16 Nov 2023.
- Brülle, Jan, and Dorothee Spannagel. 2023. *Einkommensungleichheit als Gefahr für die Demokratie: WSI-Verteilungsbericht 2023* Report Nr. 90. http://www.wsi.de/fpdf/HBS-008729/p_wsi_report_90_2023.pdf. Accessed 4 Apr 2024.
- Bruns, Antje, and Hartmut Fünfgeld. 2021. Universalisierung und Entpolitisierung von Klimawandelanpassung? *Standort* 45(4):233–238. <https://doi.org/10.1007/s00548-021-00720-y>.
- Bude, Heinz, and Philipp Staab (eds.). 2016. *Kapitalismus und Ungleichheit: Die neuen Verwerfungen*. Frankfurt, New York, München: Campus Cando.
- Buggeln, Marc. 2022. *Das Versprechen der Gleichheit: Steuern und soziale Ungleichheit in Deutschland von 1871 bis heute*. Berlin: Suhrkamp.
- Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMUV). 2020. Zweiter Fortschrittsbericht zur Deutschen Anpassungsstrategie an den Klimawandel. https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/klimawandel_das_2_fortschrittsbericht_bf.pdf. Accessed 6 Oct 2023.

- Bundeszentrale für politische Bildung (bpb). 2022. Lohnentwicklung in Deutschland und Europa: Bundeszentrale für politische Bildung.
- Cairney, P., I. Timonina, and H. Stephan. 2023. How can policy and policymaking foster climate justice? A qualitative systematic review. *Open Res Europe* 3:51.
- Chu, Eric K., and Clare E.B. Cannon. 2021. Equity, inclusion, and justice as criteria for decision-making on climate adaptation in cities. *Current Opinion in Environmental Sustainability* 51:85–94. <https://doi.org/10.1016/j.cosust.2021.02.009>.
- Daschkeit, Achim. 2012. Anpassung an den nicht mehr vermeidbaren Klimawandel – aktuelle Entwicklungen eines jungen Politikfeldes. *Zeitschrift für Staats- und Europawissenschaften (ZSE)/Journal for Comparative Government and European Policy* 10(3):410–421.
- Deutscher Bundestag. 2021. Debatte zum Armuts- und Reichtumsbericht der Bundesregierung. <https://www.bundestag.de/dokumente/textarchiv/2021/kw25-de-armutsbericht-847026>. Accessed 15 Jul 2024.
- Deutscher Bundestag. 2023a. Deutscher Bundestag – Experten plädieren für Gemeinschaftsaufgabe Klimaanpassung. <https://www.bundestag.de/dokumente/textarchiv/2023/kw45-pa-umwelt-bundesklimaanpassung-974604>. Accessed 23 Nov 2023.
- Deutscher Bundestag. 2023b. *Deutscher Bundestag Drucksache 20/8764 Gesetzentwurf der Bundesregierung Entwurf eines Bundes-Klimaanpassungsgesetzes (KANg)*
- Deutscher Bundestag. 2023c. *Beschlussempfehlung und Bericht des Ausschusses für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz (16. Ausschuss) zu dem Gesetzentwurf der Bundesregierung – Drucksache 20/8764 – Entwurf eines Bundes-Klimaanpassungsgesetzes (KANg)*
- Deutscher Wetterdienst (DWD) / Extremwetterkongress. 2023. Was wir 2023 über das Extremwetter in Deutschland wissen. Offenbach am Main, Deutschland.
- Díezmartínez, Claudia V., and Anne G. Short Gianotti. 2022. US cities increasingly integrate justice into climate planning and create policy tools for climate justice. *Nature communications* 13(1):5763. <https://doi.org/10.1038/s41467-022-33392-9>.
- Eriksen, Siri H., Andrea J. Nightingale, and Hallie Eakin. 2015. Reframing adaptation: the political nature of climate change adaptation. *Glob Environ Chang* 35:523–533. <https://doi.org/10.1016/j.gloenvcha.2015.09.014>.
- European Environment Agency (EEA). 2022. Briefing: Towards ‘just resilience’: leaving no one behind when adapting to climate change. <https://www.eea.europa.eu/publications/just-resilience-leaving-no-one-behind/towards-just-resilience-leaving-no>. Accessed 15 Jul 2024.
- Fedele, Giacomo, Camila I. Donatti, Celia A. Harvey Lee Hannah, and David G. Hole. 2019. Transformative adaptation to climate change for sustainable social-ecological systems. *Environmental Science & Policy* 101:116–125. <https://doi.org/10.1016/j.envsci.2019.07.001>.
- Forschungsgruppe „Staatsprojekt Europa“. 2014. *Kämpfe um Migrationspolitik: Theorie, Methode und Analysen kritischer Europaforschung*. Bielefeld: transcript.
- Freistaat Thüringen. 2022. Kommunale Hitzetoolbox. https://umwelt.thueringen.de/fileadmin/001_TMUEN/Unsere_Themen/Klima/Klimaanpassung/Toolbox_Thueringen.pdf. Accessed 5 Apr 2024.
- Gaus, Hansjörg, Stefan Silvestrini, Christian Kind, Theresa Kaiser. 2019. Durchführung einer Politikanalyse zur Evaluation der Deutschen Anpassungsstrategie an den Klimawandel (DAS) – Politikanalyse DAS. Dessau: Umweltbundesamt. <https://www.umweltbundesamt.de/publikationen/politikanalyse-zur-evaluation-der-deutschen>. Accessed 15 Jul 2024.
- Gebhardt, Laura, and Alexandra König. 2021. Wie vermeiden wir den Matthäuseffekt in Reallaboren? Selektivität in partizipativen Prozessen. *Raumforschung und Raumordnung | Spatial Research and Planning* 79(4):336–350. <https://doi.org/10.14512/rur.64>.
- Gross, Catherine. 2014. *Fairness and justice in environmental decision making: water under the bridge*. <https://doi.org/10.4324/9780203488997>.
- Haas, Tobias. 2017. *The political economy of the energy transition. Germany and Spain in the context of multiple crises dynamics in Europe*. <https://doi.org/10.1007/978-3-658-17319-7>. Original in German: Die politische Ökonomie der Energiewende. Deutschland und Spanien im Kontext multipler Krisendynamiken in Europa.
- Hackmann, Tobias, Gwendolyn Huschik, Jakob Maetzel, Sabrina Schmutz, Laura Sulzer and Janko Vollmer. 2018. Pflege- und Unterstützungsbedarf sogenannter vulnerabler Gruppen: Schlussbericht. Bundesministerium für Gesundheit (BMG), prognos. https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/5_Publikationen/Pflege/Berichte/Vulnerable_Gruppen_Schlussbericht_FINAL_2018_05_17.pdf. Accessed 21 Nov 2023.
- Huitema, Dave, William Neil Adger, Frans Berkhout, Eric Massey, Daniel Mazmanian, Stefania Munaretto, Ryan Plummer, and Catrien C.J.A.M. Termeer. 2016. The governance of adaptation: choices, rea-

- sons, and effects. Introduction to the Special Feature. *Ecology and Society* <https://doi.org/10.5751/ES-08797-210337>.
- Hustedt, Thuid. 2014. Negative Koordination in der Klimapolitik: Die Interministerielle Arbeitsgruppe Anpassungsstrategie. *der moderne staat – Zeitschrift für Public Policy, Recht und Management* 7(2):311–330. <https://doi.org/10.3224/dms.v7i2.17319>.
- IPCC. 2022a. *Climate change 2022: impacts, adaptation, and vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
- IPCC. 2022b. Annex I: Glossary. In *Global warming of 1.5°C: An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, ed. Valérie Masson-Delmotte, 541–562. Cambridge, United Kingdom, New York, NY: Cambridge University Press.
- IPCC. 2022c. Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001.
- Juhola, Sirkku, Milja Grundkinen, Taru Pietilä, Fanny Groundstroem, and Janina Käyhkö. 2022. Connecting climate justice and adaptation planning: an adaptation justice index. *Environmental Science & Policy* 136:609–619. <https://doi.org/10.1016/j.envsci.2022.07.024>.
- Kahlenborn, Walter, Luise Porst, Maike Voß, Uta Fritsch, Kathrin Renner, Marc Zebisch, Mareike Wolf, Konstanze Schönthaler, and Inke Schauer. 2021. Klimawirkungs- und Risikoanalyse für Deutschland 2021 (Kurzfassung) Climate Change | 26/2021, Umweltbundesamt.
- Kannankulam, John, and Fabian Georgi. 2014. Varieties of capitalism or varieties of relationships of forces? Outlines of a historical materialist policy analysis. *Capital & Class* 38(1):59–71. <https://doi.org/10.1177/0309816813513088>.
- Kates, Robert W., R. Travis William, and Thomas J. Wilbanks. 2012. Transformational adaptation when incremental adaptations to climate change are insufficient. *Proceedings of the National Academy of Sciences of the United States of America* 109(19):7156–7161. <https://doi.org/10.1073/pnas.1115521109>.
- Kennedy, Amanda. 2017. Environmental justice and land use conflict: the governance of mineral and gas resource development. <https://doi.org/10.4324/9781315713335>.
- Lehndorff, Steffen. 2012. German capitalism and the European crisis: part of the solution or part of the problem? In *A triumph of failed ideas: European models of capitalism in the crisis*, ed. Steffen Lehndorff, 79–102. Brussels: European Trade Union Inst.
- Lenikus, Valerie, Ulrich Brand, Mathias Krams, and Etienne Schneider. 2022. Historisch-materialistische Policy-Analyse. In *Handbuch Politische Ökologie*, ed. Daniela Gottschlich, Sarah Hackfort, Tobias Schmitt, and Uta von Winterfeld, 545–552. transcript.
- Massey, Eric, Dave Huitema, Heiko Garrelts, Kevin Grecksch, Heleen Mees, Tim Rayner, Sofie Storbjörk, Catrien Termeer, and Maik Winges. 2015. Handling adaptation policy choices in Sweden, Germany, the UK and the Netherlands. *Journal of Water and Climate Change* 6(1):9–24. <https://doi.org/10.2166/wcc.2014.110>.
- Morgan, M. Granger, Milind Kandlikar, James Risbey, and Hadi Dowlatabadi. 1999. Why conventional tools for policy analysis are often inadequate for problems of global change. *Climatic Change* 41(3/4):271–281. <https://doi.org/10.1023/A:1005469411776>.
- Olsson, Lennart, Maggie Opondo, Petra Tschakert et al. 2014. *Livelihoods and Poverty: Climate change 2014: impacts, adaptation, and vulnerability*. Part A: global and sectoral aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. editor / C.B. Field ; V.R. Barros ; D.J. Dokken ; K.J. Mach ; M.D. Mastrandrea ; T.E. Bilir ; M. Chatterjee ; K.L. Ebi ; Y.O. Estrada ; R.C. Genova ; B. Girma ; E.S. Kissel ; A.N. Levy ; S. MacCracken ; P.R. Mastrandrea ; L.L. White. Cambridge University Press, 2014. pp. 793–832.
- Orlove, Ben. 2010. The past, the present and some possible futures of adaptation. In *Adapting to climate change: thresholds, values, governance*, ed. Neil Adger, Irene Lorenzoni, and Karen L. O'Brien, 131–163. Cambridge: Cambridge University Press.

- Remling, Elise. 2019. Adaptation, now? Exploring the politics of climate adaptation through poststructuralist discourse theory. SÖDERTÖRN DOCTORAL DISSERTATIONS, Södertörn university. <https://www.diva-portal.org/smash/get/diva2:1366579/FULLTEXT01.pdf>. Accessed 16 Nov 2023.
- Remling, Elise. 2023. Exploring the affective dimension of climate adaptation discourse: political fantasies in German adaptation policy. *Environment and Planning C: Politics and Space* 41(4):714–734. <https://doi.org/10.1177/23996544231154368>.
- Ribot, Jesse. 2011. Vulnerability before adaptation: toward transformative climate action. *Global Environmental Change* 21(4):1160–1162. <https://doi.org/10.1016/j.gloenvcha.2011.07.008>.
- Ribot, Jesse. 2014. Cause and response: vulnerability and climate in the Anthropocene. *The Journal of Peasant Studies* 41(5):667–705. <https://doi.org/10.1080/03066150.2014.894911>.
- Saurer, Johannes. 2022. Klimaanpassung im Mehr-Ebenen-System des Rechts. *Natur und Recht* 44(8): 513–519. <https://doi.org/10.1007/s10357-022-4055-z>.
- Schneider, Tina. 2014. Responsibility for private sector adaptation to climate change. *Ecology and Society* 19(2):.
- Schneider, Etienne, Alina Brad, Ulrich Brand, Mathias Krams, and Valerie Lenikus. 2023. Historical-materialist policy analysis of climate change policies. In *Handbook on critical political economy and public policy*, ed. Christoph Scherrer, Ana Garcia, and Joscha Wullweber, 110–126. Edward Elgar Publishing.
- Scolobig, Anna, Jo Anne Linnerooth-Bayer, Mark Pelling, Juliette G.C. Martin, Teresa M. Deubelli, Wei Liu, and Amy Oen. 2023. Transformative adaptation through nature-based solutions: a comparative case study analysis in China, Italy, and Germany. *Regional Environmental Change* 23(2):69. <https://doi.org/10.1007/s10113-023-02066-7>.
- Siedschlag, Daniela, Christian Kuhlicke, Sabrina Köhler, Torsten Masson, Sebastian Bamberg, Alfred Olfert, Gerhard Hutter, Daniel Osberghaus, and Michael Barth. 2023. Risikokommunikation zur Stärkung privater Eigenvorsorge. Climate Change 3. https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/cc_03-2023_risikokommunikation_zur_staerkung_privater_eigenvorsorge.pdf. Accessed 4 Apr 2024.
- Stecker, R. 2015. Zur Entstehung des neuen Politikfeldes Klimawandelanpassungspolitik in Deutschland. *dms – der moderne staat – Zeitschrift für Public Policy, Recht und Management*.
- Strange, Kaitlin F., March Hug, and Mar Satorras. 2024. Incorporating climate justice into adaptation planning: the case of San Francisco. *Cities* 144:104627. <https://doi.org/10.1016/j.cities.2023.104627>.
- Streeck, Wolfgang. 1997. German capitalism: Does it exist? Can it survive? *New Political Economy*, 2(2), 237–256. <https://doi.org/10.1080/13563469708406299>
- Streeck, Wolfgang. 2014. How will capitalism end? *New Left Review* 87..
- Taylor, Marcus. 2014. The political ecology of climate change adaptation: livelihoods, agrarian change and the conflicts of development. In *The political ecology of climate change adaptation: livelihoods, agrarian change and the conflicts of development*, 1–206. <https://doi.org/10.4324/9780203762486/POLITICAL-ECOLOGY-CLIMATE-CHANGE-ADAPTATION-MARCUS-TAYLOR>.
- Taylor, Marcus, et al. 2022. Putting “vulnerable groups” at the centre of adaptation interventions by promoting transformative adaptation as a learning process. Norwegian University of Life Sciences. https://www.nmbu.no/en/faculty/landsa_m/departement/fohe.
- Teebken, Julia. 2024. Vulnerability locked in. On the need to engage the outside of the adaptation box. *Global Environmental Change* <https://doi.org/10.2139/ssrn.4427407>.
- Teebken, Julia and Michael Schipperges. 2024. *Soziale Frage Klimawandel. Klimaanpassung als sozialpolitische Gestaltungsaufgabe*. Friedrich-Ebert-Stiftung diskurs 7/2024.
- Thomas, Kimberley Anh, and Benjamin P. Warner. 2019. Weaponizing vulnerability to climate change. *Global Environmental Change* 57:101928. <https://doi.org/10.1016/j.gloenvcha.2019.101928>.
- Thomas, Kimberley R.Dean Hardy, Heather Lazrus, Michael Mendez, Ben Orlove, Isabel Rivera-Collazo, J. Roberts Timmons, Marcy Benjamin P.Warner Rockman, and Robert Winthrop. 2018. Explaining differential vulnerability to climate change: A social science review. <https://doi.org/10.1002/wcc.565>.
- Tschakert, Petra, Bob van Oort, Asuncion Lera St. Clair, and Armando LaMadrid. 2013. Inequality and transformation analyses: a complementary lens for addressing vulnerability to climate change. *Climate and Development* 5(4):340–350. <https://doi.org/10.1080/17565529.2013.828583>.
- UBA. Kompetenzzentrum KomPass. <https://www.umweltbundesamt.de/themen/klima-energie/klimafolgenanpassung/kompetenzzentrum-kompass-0>. Accessed 24 Nov 2023.
- United Nations Environment Programme (UNEP). 2022. Adaptation gap report 2022. <https://www.unep.org/resources/adaptation-gap-report-2022>. Accessed 21 July 2023.

- Vetter, Andreas, Esther Chrischilles, Klaus Eisenack, Christian Kind, Petra Mahrenholz, and Anna Pechan. 2017. Anpassung an den Klimawandel als neues Politikfeld. In *2017 – Klimawandel in Deutschland*, ed. Brasseur Jacob, 325–334.
- Vetter, Andreas, Klaus Eisenack, Christian Kind, Petra Mahrenholz, Sandra Naumann, Anna Pechan, and Luise Willen. 2023. Das Politikfeld „Anpassung an den Klimawandel“ im Überblick. In *Klimawandel in Deutschland*, ed. Guy P. Brasseur, Daniela Jacob, and Susanne Schuck-Zöller, 475–489. Berlin, Heidelberg: Springer.
- Warner, Benjamin P., and Christopher P. Kuzdas. 2017. The role of political economy in framing and producing transformative adaptation. *Current Opinion in Environmental Sustainability* 29:69–74. <https://doi.org/10.1016/j.cosust.2017.12.012>.
- Watts, Michael J., and Hans G. Böhle. 1993. The space of vulnerability: the causal structure of hunger and famine. 17(1):43–67. <https://doi.org/10.1177/0309132516646495>.
- Weiland, Sabine. 2016. Anpassung an den Klimawandel aus Governance-Sicht. In *Klimaanpassung in Forschung und Politik*, ed. Andreas Marx, 91–101. Wiesbaden: Springer.
- Wolf, Mareike, Can Ölmez, Konstanze Schönthaler, Luise Porst, Maike Voß, Manuel Linsenmeier, Walter Kahlenborn, Lukas Dorsch, Leonie Dudda (2021). Klimawirkungs- und Risikoanalyse 2021 für Deutschland | Teilbericht 5: Risiken und Anpassung in den Clustern Wirtschaft und Gesundheit. German Environment Agency (UBA). https://www.umweltbundesamt.de/sites/default/files/medien/479/publikationen/kwra2021_teilbericht_5_cluster_wirtschaft_gesundheit_bf_211027_0.pdf. Accessed 26 Nov 2023.

Further Reading

- Kuran, C.H.A., C. Morsut, B.I. Kruke, M. Krüger, L. Segnestam, K. Orru, et al, 2020. Vulnerability and vulnerable groups from an intersectionality perspective. *International Journal of Disaster Risk Reduction* 50:101826. <https://doi.org/10.1016/J.IJDRR.2020.101826>.

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