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# The political economy of the social constraints to adaptation

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The constraints to effective, efficient, equitable and fair climate change adaptation have been defined and discussed in the literature for over two decades now. In this review, we discuss the socioeconomic and cultural factors that underpin what climate change adaptation can and cannot achieve. We focus on insights into the constraints to adaptation that come from scholars writing from a political economy lens, showing that the interests of often distant powerful actors and institutions are as important as behaviours and attitudes in constraining adaptation.

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## Introduction

Adaptation to climate change involves processes to reduce or avoid the risks of climate change to the things that people value. Many things that people value are at great risk, and the latest Adaptation Gap Report published by the United Nations Environment Programme (UNEP) at the end of 2023 highlights a paradox: the urgency of adaptation is increasingly met with a deceleration in adaptation progress, particularly amongst most vulnerable populations [35]. Many factors delay adaptation, including a lack of sufficient finance, appropriate governance, knowledge deficits, and disagreements about the goals and means of implementation. The urgency of adaptation increases in line with the failure to reduce emissions, as this failure shortens the critical window in which effective

adaptation can be implemented. Failure to overcome these constraints in time leads to tipping points in social and environmental systems such that exposed populations experience loss and damage [37].

The issue of timing in adaptation is important because there are adaptation measures that, while potentially effective against climate change, are not currently being implemented due to social constraints. Social constraints are social factors that ‘make it harder to plan and implement adaptation actions’ [46] but that can be overcome with concerted efforts [9]. Buying time through mitigation increases the opportunity to overcome constraints and so increases the chances for successful adaptation. It also allows time for individuals and communities to adjust their expectations of what needs to be secured from climate change through adaptation and the ways in which this can be done [1,12,43].

Social constraints to adaptation are generally categorised as being economic, technological and social, with the latter category often a catch-all for political, cultural and psychological factors that are often very context specific. In practice, this challenges the top-down and universalising nature of much climate change research, requiring instead local and contextual knowledge ‘from somewhere’ in order to overcome the constraints to adaptation [40].

Research on the social constraints to adaptation initially focussed on proximate actors and their values, emotions, beliefs and worldviews. While highly relevant in terms of understanding social constraints, these inner dimensions tend to be more important in contexts where individual agency is relatively unconstrained by inequality — namely, in more researched and more developed countries where basic needs are covered, climate risks are buffered by strong social safety networks, and many constraints to adaptation are more attitudinal/behavioural (a situation we call ‘not wanting’ to adapt) [48].

To complement this, there is a growing body of research adopting a political economy lens that focuses more on the root causes of powerlessness and injustice and conceptualises constraints as emanating from outside the actor’s reach. There are diverse traditions within the broad remit of ‘political economy’, but most traditions would agree that social change across social groups and places is a function of the interplay between institutions,

interests and ideas and, in particular, the way these interact to determine the relative influence of markets and the state in the distribution of public and private goods [14,27,44]. Several studies show that adaptation to climate change is a matter of political economy because market-based approaches to policy implementation are often used, and these do not protect public goods but rather exacerbate social injustices and lead to maladaptation [19,22,23,28,49].

A political economy perspective does not reduce adaptation success to being merely the agency of vulnerable individuals and communities and whether they want to adapt or not. Analysis of social constraints that focuses on capacities, risk perceptions, attitudes and behaviours of individuals and communities ignores that ‘not wanting to adapt’ is far less relevant in contexts where markets, governments and institutions are themselves the constraints that we suggest are ‘not allowing’ people to adapt.

Political economic approaches to vulnerability are well established, showing how the root causes of vulnerability extend beyond local environments and into wider social contexts where the ideas, interests and institutions, such as capital, markets, governments, regulations and violence, shape who and what is vulnerable [13,2,8]. Yet, we and others argue that when looking at social constraints, these categorisations are often applied apolitically, presenting social limits as ‘technical’ issues found at different scales (the personal, the communal and the societal), such that there are calls for a more critical exploration of the political economy that allows for such social constraints to arise in the first place [22,45].

In this review suggest that social constraints originate in two basic ways. First, they arise from the way social systems expose some groups to climate change risks and reduce their opportunities to adapt by constraining their adaptive capacities or impeding their adaptation responses [9]. A good example of this is the asymmetric distribution of power that creates inequality along gender, class or ethnicity lines within any given social system [6]. These types of social constraints to adaptation mean there is what we call a ‘wanting but cannot’ state in which actors are willing to implement adaptive actions, but these are hindered by structural power imbalances. Unequal power relations also mean that adaptation knowledge remains inaccessible to those who are most in need of it, particularly among Indigenous peoples and in contexts where enduring colonial structures constrain local adaptive capacity [10,15,33].

For example, one such powerful social driver of multiple constraints to adaptation is violence, even if this is frequently overlooked in research on adaptation. Violence is the threat or infliction of harm and ranges in scale from

interpersonal (such as family, domestic and intimate partner violence) to armed conflicts within states through to interstate warfare. In every instance, violence constrains adaptation. Interpersonal violence can harm people physically and mentally, as well as impact their subjective and objective well-being (i.e. their life satisfaction and their capacity to fulfil their needs) [31]. Violence constrains people’s ability to access, for example, financial services, health care, information, social services and work, all of which impede adaptive action [38,41,7]. Armed conflict and war have similar effects and can also have structural impacts, such as damage to crops, damage to physical capital and disruption of markets [18,32,5]. We would add that a political economic analysis of these impacts and ‘losers’ from violence would be remiss to ignore the winners, most notably those who gain financially from violently appropriating labour and capital, selling weapons and profiting from higher prices and those who make political gains from the implied or actual use of violence. The repercussions of this are that, from a political economy angle, winners from violence themselves constitute a social constraint to adaptation that often goes unnoticed.

The second way we suggest that social constraints to adaptation arise is through the way the things that people value and which are vulnerable to climate change are the product of shared meanings and cultural norms [4]. Meanings and cultural norms and values are internalised through psychological processes and enacted through individual and community dispositions, and as such, they are more than intrapsychic factors negotiated socially. Because they do not exist in a power vacuum, they can rightly be considered political economic in that shared meanings — such as the ‘nation’ — and cultural values — such as individualism — are amenable to manipulation and subject to power imbalances. Thus, risk perception and risk tolerance are subjective psychological perceptions constructed socioculturally and so are intrinsically attached to cultures [20]. These sociocultural constraints to adaptation can be seen in the unwillingness to implement adaptation options (‘can but do not want’), such as eating genetically engineered foods or drinking recycled water, due to moral considerations or a lack of trust in regulators. Cultural values and worldviews also underpin the goals of adaptation and are embedded in the ethos of societies in the form of traditions and lived values that can in themselves hinder adaptation, for example, when there is no mandate for legislation to affect adaptation such that it is met with political opposition [26].

The issue of the cost of adaptation relative to available funds speaks to the power of ideas and norms to constrain adaptation. To our reading, ‘cost’ is often discussed as if it were a technical and matter-of-fact constraint to adaptation, yet this claim is not a claim

about the scarcity of money for adaptation, nor is it about the calculation of costs, since these are often poorly understood [25]. More importantly, the costs of adaptation must be considered alongside avoided damages, many of which are incommensurate with money, including, for example, life, health, well-being, culture, valued places, sovereignty, self-determination, social cohesion, and heritage. Rather, we suggest that the cost of adaptation is in effect a matter of how institutions and interests allocate spending on public goods within and between countries. For example, as Buchner et al. [17] show, funding for both climate change mitigation and adaptation is equal to or less than 20% of global funding for fossil fuel subsidies. Decision-making processes that transparently reveal these kinds of otherwise hidden trade-offs in values are key to overcoming constraints to adaptation [11,36].

Thus, from a political economy perspective, the principles and rules that guide adaptation finance — including the governance of the institutions that administer adaptation funds — can, in themselves, be rightly seen as constituting social constraints. Indeed, there is evidence of a switch from a distributive justice paradigm to a more overt reliance on markets and the private sector for funding adaptation since the Paris Agreement. In practice, this means that constraints that are conceived as purely financial (e.g. lack of money) are in fact the result of governments and institutions embracing neoliberal principles and limited liability, and the resulting growing indebtedness of countries trying to adapt adds to existing power asymmetries that result in more constraints to adaptation [36].

This is not to say that political economy approaches consider social constraints to be insurmountable. Just as behaviours, attitudes, traditions and values can change so too can power balances. We suggest there are a number of actions that can be undertaken to address the underlying drivers of social constraints to adaptation. These include increasing the public mandate for investment in adaptation within countries and in the interests of those at risk across the globe; enhanced communication strategies with a positive, hopeful message asserting that adaptation is possible; and promoting changes in sociocultural norms [21,31,39,3]. Furthermore, locally led adaptation, empowering grassroots movements and communities, cultivating networks and solidarity, more equitable adaptation financing, increased transparency in decision-making and shared governance, and developing new institutions capable of careful and committed co-production of knowledge can all help transform the political economy of adaptation to overcome constraints [16,29,34,43,47].

Overcoming social constraints and limits can also happen by moving the adaptation goalposts. The literature

shows that even in cases where climate impacts have changed the characteristics of social and environmental systems, people have nonetheless adapted in place. For example, in the islands off the coast of Tubigon in the Philippines, communities endure tidal inundation episodes for almost half of the year, yet people have stayed in their homes and adapted to the new conditions, questioning the validity of sea-level rise as a hard limit in small, low-lying islands [24]. For the affected communities in Tubigon, the values and goals that underpin adaptation are maintaining their homes and their livelihoods rather than a generic concept of habitability, which they do not see as being compromised by severe and frequent flooding [30]. This example shows that a community's risk perception and values are important factors in overcoming adaptation constraints and even limits.

In sum, we argue that overcoming constraints to adaptation largely depends on the willingness to act on the deeper political economic processes that give rise to them. Since many of these causes are systemic, such as the nature of governments and markets [42], incremental adaptation is unlikely to be sufficient. This underscores calls for transformative adaptation, which may have the purpose and scale of change needed to overcome many of the most ubiquitous and powerful social constraints to adaptation.

## Data Availability

No data were used for the research described in the article.

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Sergio Jarillo reports financial support was provided to Jon Barnett by Australian Research Council (Project FL180100040). If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References and recommended reading

Papers of particular interest, published within the period of review, have been highlighted as:

- of special interest
- of outstanding interest

1. Adams H, Blackburn S, Mantovani N: **Psychological resilience for climate change transformation: relational, differentiated and situated perspectives**. *Curr Opin Environ Sustain* 2021, **50**:303-309, <https://doi.org/10.1016/j.cosust.2021.06.011>
2. Adger WN: **Vulnerability**. *Glob Environ Change* (3) 2006, **16**:268-281, <https://doi.org/10.1016/j.gloenvcha.2006.02.006>

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3. Adger WN, Barnett J, Heath S, Jarillo S: **Climate change affects multiple dimensions of well-being through impacts, information and policy responses.** *Nat Hum Behav* 2022, **6**:1465-1473, <https://doi.org/10.1038/s41562-022-01467-8>
4. Adger WN, Dessai S, Goulden M, Hulme M, Lorenzoni I, Nelson DR, Naess LO, Wolf J, Wreford A: **Are there social limits to adaptation to climate change?** *Clim Change* 2009, **93**:335-354, <https://doi.org/10.1007/s10584-008-9520-z>
5. Adger WN, Pulhin JM, Barnett J, Dabelko GD, Hovelsrud GK, Levy M, Oswald Spring U, Vogel CH: **Human security.** In *Climate Change: 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*. Edited by Field CB, Barros VR, Dokken DJ, Mach KJ, Mastrandrea MD, Bilir TE, Chatterjee M, Ebi KL, Estrada YO, Genova RC, Girma B, Kissel ES, Levy AN, MacCracken S, Mastrandrea PR, White LL. Cambridge University Press; 2014:755-791.
6. Aryal JP, Sapkota TB, Rahut DB, Gartaula HN, Stirling C: **Gender and climate change adaptation: a case of Ethiopian farmers.** *Nat Resour Forum* 2022, **46**:263-288, <https://doi.org/10.1111/1477-8947.12259>
7. Ayeb-Karlsson S, Chandra A, McNamara KE: **Stories of loss and healing: connecting non-economic loss and damage, gender-based violence and wellbeing erosion in the Asia-Pacific region.** *Clim Change* 2023, **176**:157, <https://doi.org/10.1007/s10584-023-03624-y>
8. Barnett J: **Global environmental change II: political economies of vulnerability to climate change.** *Prog Hum Geogr* 2020, **44**:1172-1184, <https://doi.org/10.1177/0309132519898254>
9. Barnett J, Evans LS, Gross C, Kiem AS, Kingsford RT, Palutikof JP, Pickering CM, Smithers SG: **From barriers to limits to climate change adaptation: path dependency and the speed of change.** *Ecol Soc* 2015, **20**:art5, <https://doi.org/10.5751/ES-07698-200305>
10. Barnett J, Konlechner T, Waters E, Minnapinni MW, Jarillo S, Austral B, De Santis J, Head L, Rioli C, King A: **"Winga is trying to get in": local observations of climate change in the Tiwi Islands.** *Earth's Future* 2023, **11**:1-18, <https://doi.org/10.1029/2022EF002808>
11. Bedsworth LW, Hanak E: **Adaptation to climate change: a review of challenges and tradeoffs in six areas.** *J Am Plan Assoc* 2010, **76**:477-495.
12. Berrang-Ford L, Siders AR, Lesnikowski A, Fischer AP, Callaghan MW, Haddaway NR, Mach KJ, Araos M, Shah MAR, Wannowitz M, Doshi D, Leiter T, Matavel C, Musah-Surugu JI, Wong-Parodi G, Antwi-Agyei P, Ajjabade I, Chauhan N, Kakenmaster W, ... Abu TZ: **A systematic global stocktake of evidence on human adaptation to climate change.** *Nat Clim Change* 2021, **11**:989-1000, <https://doi.org/10.1038/s41558-021-01170-y>.  
This large systematic review on climate change adaptation used machine learning to screen over 48 000 articles and a network of 126 scholars to review 1682 of them. The review gives a snapshot of the state of adaptation, showing that the literature barely looks at implemented adaptation responses. Evidence of transformational adaptation or even effective adaptation (in terms of reducing climate risks) is also scant, highlighting how one of the main barriers for adaptation remains how little knowledge of it there is.
13. Bezner Kerr R, Naess LO, Allen-O'Neil B, Totin E, Nyantakyi-Frimpong H, Risvoll C, Rivera Ferre MG, López-i-Gelats F, Eriksen S: **Interplays between changing biophysical and social dynamics under climate change: implications for limits to sustainable adaptation in food systems.** *Glob Change Biol* 2022, **28**:3580-3604, <https://doi.org/10.1111/gcb.16124>
14. Blyth M: **Great Transformations: Economic Ideas and Institutional Change in the Twentieth Century.** Cambridge University Press; 2002.
15. Bordner AS, Ferguson CE, Ortolano L: **Colonial dynamics limit climate adaptation in Oceania: perspectives from the Marshall Islands.** *Glob Environ Change* 2020, **61**:102054, <https://doi.org/10.1016/j.gloenvcha.2020.102054>
16. Brink E, Falla AMV, Boyd E: **Weapons of the vulnerable? A review of popular resistance to climate adaptation.** *Glob Environ Change* 2023, **80**:102656, <https://doi.org/10.1016/j.gloenvcha.2023.102656>
17. Buchner B, Naran B, Padmanabhi R, Stout S, Strinati C, Wignarajah D, Miao G, Connolly J and Marini N (2023): **Global Landscape of Climate Finance 2023; Climate Policy Initiative:** (<https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/>).
18. Caso N, Hilhorst D, Mena R: **The contribution of armed conflict to vulnerability to disaster: empirical evidence from 1989 to 2018.** *Int J Disaster Risk Reduct* 2023, **95**:103881, <https://doi.org/10.1016/j.ijdrr.2023.103881>
19. Chu E: **The political economy of urban climate adaptation and development planning in Surat, India.** *Environ Plan C Gov Policy* 2016, **34**:281-298.
20. Dacks R, Ticktin T, Mawyer A, Caillon S, Claudet J, Fabre P, Jupiter SD, McCarter J, Mejia M, Pascua P, Sterling E, Wongbusarakum S: **Developing biocultural indicators for resource management.** *Conserv Sci Pract* 2019, **1**:e38, <https://doi.org/10.1111/csp2.38>
21. Elrick-Barr CE, Smith TF, Thomsen DC: **Is 'hope' helpful or a hindrance? Implications for coastal governance.** *Ocean Coast Manag* 2024, **248**:106953, <https://doi.org/10.1016/j.ocecoaman.2023.106953>
22. Eriksen SH, Nightingale AJ, Eakin H: **Reframing adaptation: the political nature of climate change adaptation.** *Glob Environ Change* 2015, **35**:523-533, <https://doi.org/10.1016/j.gloenvcha.2015.09.014>
23. Eriksen S, Schipper ELF, Scoville-Simonds M, Vincent K, Adam HN, Brooks N, Harding B, Lenaerts L, Liverman D, Mills-Novoa M, Mosberg M: **Adaptation interventions and their effect on vulnerability in developing countries: help, hindrance or irrelevance?** *World Dev* 2021, **141**:105383.
24. Esteban M, Jameró MaL, Nurse L, Yamamoto L, Takagi H, Thao ND, Mikami T, Kench P, Onuki M, Nellas A, Crichton R, Valenzuela VP, Chadwick C, Avelino JE, Tan N, Shibayama T: **Adaptation to sea level rise on low coral islands: lessons from recent events.** *Ocean Coast Manag* 2019, **168**:35-40, <https://doi.org/10.1016/j.ocecoaman.2018.10.031>
25. Fankhauser S: **The costs of adaptation.** *WIREs Clim Change* 2010, **1**:23-30, <https://doi.org/10.1002/wcc.14>
26. Graham S, Barnett J, Fincher R, Hurlimann A, Mortreux C, Waters E: **The social values at risk from sea-level rise.** *Environ Impact Assess Rev* 2013, **41**:45-52 <https://doi.org/10.1016/j.eiar.2013.02.002>.
27. Hall P: **The role of interests, institutions, and ideas in the comparative political economy of the industrialized nations.** In *Comparative Politics: Rationality, Culture and structure*. Edited by Lichbach MI, Zuckerman AS. Cambridge University Press; 1997:174-207.
28. Henrique KP, Tschakert P: **Pathways to urban transformation: from dispossession to climate justice.** *Prog Hum Geogr* 2020, **45**:169-1191.
29. Hill R, Walsh FJ, Davies J, Sparrow A, Mooney M, Wise RM, Tengö M: **Knowledge co-production for Indigenous adaptation pathways: transform post-colonial articulation complexes to empower local decision-making.** *Glob Environ Change* 2020, **65**:102161, <https://doi.org/10.1016/j.gloenvcha.2020.102161>
30. Jameró ML, Esteban M, Chadwick C, Onuki M: **Rethinking the limits of climate change adaptation.** *Asian Dev Bank Econ Work Pap Ser* (584) 2019, <https://doi.org/10.2139/ssrn.3590177>
31. Jarillo S, Crivelli C: **Perspectives on Indigenous well-being and climate change adaptation.** *WIREs Clim Change* 2024, **15**, <https://doi.org/10.1002/wcc.877>
32. Jarrar S: **Adaptation under occupation: climate change vulnerability.** *Prolonged Occupation and International Law.* Brill Nijhoff; 2023:176-196.
33. Johnson DE, Parsons M, Fisher K: **Indigenous climate change adaptation: new directions for emerging scholarship.** *Environ Plan E Nat Space* 2021, **5**:1541-1578, <https://doi.org/10.1177/25148486211022450> 25148486211022450

34. Khan M, Ruszczak HA, Rahman MF, Huq S: **Epistemological freedom: activating co-learning and co-production to decolonise knowledge production** (ahead-of-print), *Disaster Prev Manag Int J* 2021, **31**:182-192, <https://doi.org/10.1108/DPM-03-2021-0070>
35. Malik IH, Ford JD: **Addressing the climate change adaptation gap: key themes and future directions**. *Climate* 2024, **12**:24, <https://doi.org/10.3390/cli12020024>.  
This article analyses the findings of UNEP's 2023 Adaptation Gap Report, as well as reviewing grey and peer-reviewed literature from COP28 to provide a critical overview of the global state of climate change adaptation. The findings highlight a widening adaptation finance gap and a lack of socioeconomic considerations when it comes to adaptation planning, especially in terms of equity and justice. The article concludes that some adaptation framings and actions — such as 'capacity building' — are counterproductive, as they maintain power asymmetries and create barriers for more equitable knowledge exchanges and capacity sharing.
36. Martin MA, Boakye EA, Boyd E, Broadgate W, Bustamante M, Canadell JG, Carr ER, Chu EK, Cleugh H, Csevár S, Daoudy M, De Bremond A, Dhimal M, Ebi KL, Edwards C, Fuss S, Girardin MP, Glavovic B, Hebden S, ... Zhao ZJ: **Ten new insights in climate science 2022**. *Glob Sustain* 2022, **5**:e20, <https://doi.org/10.1017/sus.2022.17>.  
This article uses a summary of recent (2022) research on climate change to produce 10 New Insights in Climate Science that synthesize scientific advancements in different areas of the earth's system, including socioeconomic and cultural ones. The article gives evidence of ongoing injustice and lack of inclusiveness in climate decision-making, which is at least partly attributed to colonial legacies and contemporary geopolitics that increase socioeconomic inequality and vulnerability. The authors show that inclusive, bottom-up approaches to adaptation empower communities and individuals and build up resilience. They also point to unsustainable production and consumption growth as a paradigm constraining adaptation.
37. Martyr-Koller R, Thomas A, Schleussner CF, Nauels A, Lissner T: **Loss and damage implications of sea-level rise on small island developing states**. *Curr Opin Environ Sustain* 2021, **50**:245-259, <https://doi.org/10.1016/j.cosust.2021.05.001>
38. Medina L, Ensor MO, Schapendonk F, Sieber S, Pacillo G, Laderach P, Hellin J, Bonatti M: **Community voices on climate, peace and security: a social learning approach to programming environmental peacebuilding**. *Environ Secur* 2024, **2**:75-104, <https://doi.org/10.1177/27538796231207030>
39. Mortreux C, Barnett J, Jarillo S, Greenaway KH: **Reducing personal climate anxiety is key to adaptation**. *Nat Clim Change* 2023, **13**:590, <https://doi.org/10.1038/s41558-023-01716-2>
40. O'Brien K, Barnett J: **Global environmental change and human security**. *Annu Rev Environ Resour* 2013, **38**:373-391, <https://doi.org/10.1146/annurev-environ-032112-100655>
41. Remling E, Meijer K: **Conflict considerations in the United Nations Framework Convention on Climate Change's National Adaptation Plans**. *Clim Dev* 2024, **1**-15, <https://doi.org/10.1080/17565529.2024.2321156>
42. Roberts JT: **Does the arc of history bend towards climate justice? Towards an agenda for engaged research**. *A Research Agenda for Global Environmental Politics*. Edward Elgar Publishing; 2018:163-176.
43. Scolobig A, Linnerooth-Bayer J, Pelling M, Martin JGC, Deubelli TM, Liu W, Oen A: **Transformative adaptation through nature-based solutions: a comparative case study analysis in China, Italy, and Germany**. *Reg Environ Change* 2023, **23**:69, <https://doi.org/10.1007/s10113-023-02066-7>.  
Using empirical data from three adaptation case studies, this article explores the transformational possibilities of Nature-based Solutions. The study finds that constraints to adaptation are mostly socioeconomic, in the form of financial, institutional and regulatory barriers. The authors note the global consensus on the urge for transformational adaptation, pointing to the need for systemic socioeconomic changes driven by inclusiveness and engagement that would lead to more equitable results.
44. Sen A: **Well-being, agency and freedom: the Dewey lectures 1984**. *J Philos* 1985, **82**:169-221.
45. Serrao-Neumann S, Moreira FDA, Dalla Fontana M, Torres RR, Lapola DM, Nunes LH, Marengo JA, Di Giulio GM: **Advancing transdisciplinary adaptation research practice**. *Nat Clim Change* 2021, **11**:1006-1008, <https://doi.org/10.1038/s41558-021-01221-4>
46. Thomas A, Theokritoff E, Lesnikowski A, Reckien D, Jagannathan K, Cremades R, ... Bowen K: **Global evidence of constraints and limits to human adaptation**. *Reg Environ Change* 2021, **21**:1-15.
47. Vincent K: **Development geography II: community-based adaptation and locally-led adaptation**. *Prog Hum Geogr* 2023, **47**:604-612, <https://doi.org/10.1177/03091325231166076>
48. Wamsler C, Osberg G, Panagiotou A, Smith B, Stanbridge P, Osika W, Mundaca L: **Meaning-making in a context of climate change: supporting agency and political engagement**. *Clim Policy* 2023, **23**:829-844, <https://doi.org/10.1080/14693062.2022.2121254>
49. Warner BP, Kuzdas CP: **The role of political economy in framing and producing transformative adaptation**. *Curr Opin Environ Sustain* 2017, **29**:69-74.