INTERNATIONAL

Enhancing International Cooperation and Action to Adapt to Climate Tipping Points in an Overshoot World

Discussion Paper

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Climate tipping points—critical thresholds beyond which components of the Earth system undergo rapid and often irreversible change—pose a growing challenge for global adaptation action. Reaching climate tipping points would have cascading impacts on water, food, health, and ecosystems. While mitigation must remain the primary means of reducing the risk of crossing climate tipping points, adaptation action will also be necessary for greater resilience to potential impacts. The potential for crossing global tipping points reinforce the case for adaptation as a global public good, going beyond the need for national or local adaptation.

The global climate adaptation architecture—including the UN Framework Convention on Climate Change (*UNFCCC*) and the Paris Agreement—has made important progress but is not yet fully equipped to address systemic, transboundary, and non-linear climate risks, including climate tipping points. Existing adaptation frameworks are largely national in scope and do not adequately address regional or transboundary risks. Enhanced international cooperation is needed and there is a case for stronger inclusion and consideration of transboundary and transformational adaptation action within the UNFCCC process. Parties could consider the following options:

- providing further guidance to the Baku Adaptation Road Map (*BAR*) to advance work on transboundary climate risks, systemic impacts, and adaptation under overshoot scenarios
- exploring opportunities to address climate risk scenarios, data gaps, and regional adaptation cooperation while respecting national sovereignty through work under the Just Transition Work Programme (*JTWP*), the National Adaptation Plan (*NAP*) process, and the Belém-Addis vision on adaptation (*BAVA*)
- identifying and advancing mechanisms and/or decisions that strengthen climate data systems, risk assessments, and scenario planning to support adaptation decisions under increasing uncertainty
- sending signals or setting targets via the Second Global Stocktake (*GST2*) outcome to: strengthen the assessment of transboundary climate risks within adaptation planning processes; integrate these risks into NAPs; support regional adaptation initiatives and cooperative mechanisms; and build on existing frameworks and evidence, including the Adaptation Without Borders and IPCC assessments of transboundary climate risks.[1]

Thought also needs to be given—including in the context of the UN80 reform process—as to whether the overall UN climate governance structure is sufficient to respond to the possible crossing of planetary boundaries and climate tipping points. In this regard, the notion of a new UN Climate Council, as proposed by President Lula of Brazil, deserves further examination.

Content

Questions for Consideration

- To what extent could—and should—adaptation efforts under the UNFCCC and the Paris Agreement be reframed as a global public good requiring enhanced international cooperation, rather than primarily national or local responsibilities?
- Should discussions under the UNFCCC and Paris Agreement place greater emphasis on preparing for the potential crossing of climate tipping points, including through enhanced international cooperation?
- What institutional and scientific gaps currently limit the UNFCCC and the Paris Agreement's abilities to consider cross-border and cascading climate tipping point risks and how might these gaps be addressed?
- Could UNFCCC and Paris Agreement workstreams and processes more explicitly and usefully integrate climate tipping point risks and overshoot scenarios into their mandates, planning, and implementation efforts? If yes, which ones and how?
- Is additional UN governance needed to prepare for the possible crossing of climate tipping points?

A. Background

Context

1. Climate tipping points—critical thresholds beyond which components of the Earth system undergo rapid and often irreversible change—could trigger abrupt and irreversible changes with severe consequences for ecosystems, economies, lives, and societies.[2]

2. Because some climate tipping points may be crossed even under ambitious mitigation scenarios, adaptation will be necessary to prepare for and cope with their consequences.[3] However, mitigation must remain the top priority, as limiting emissions is essential to reducing the risk and extent of climate overshoot.

3. Despite some progress on addressing climate change, global temperature rise is set to cross 1.5 degrees Celsius above pre-industrial levels, likely within the next few years, given this there is a risk that the world will cross various climate tipping points.[4] According to the UN Secretary General: "We must make the overshoot as small and short as possible — limiting how high temperatures rise and how long they remain above 1.5."[5] While current national climate commitments are bending the global emissions trajectory downward, they remain insufficient to keep warming within 1.5 degrees Celsius, underscoring the need for accelerated mitigation efforts. As such, there is an urgency to prepare to confront the effects of possible climate tipping points, particularly where they may disrupt water security, food systems, health, and ecosystems. The world has already reached its first climate tipping point: widespread mortality of warm-water coral reefs is underway.[6]

4. Parties have made progress under the UNFCCC process and the Paris Agreement on adaptation and the world is moving toward increasing resilience. The Global Goal on Adaptation (***GGA***) United Arab Emirates (***UAE***) Framework for Global Climate Resilience (***UAE Framework***) has been operationalized and the Belém Adaptation Indicators adopted, providing a clearer structure for tracking global adaptation efforts.[7]

5. Enhancing international cooperation will be essential to prepare for the increasing cross border impacts of climate change, including those resulting from crossing climate tipping points. The potential global consequences of this reinforces the case for adaptation as a global public good, not just a national or local imperative.[8] However, the politicized nature of adaptation negotiations under the UNFCCC and Paris Agreement has complicated discussions on transboundary impacts.

6. With 2030 fast approaching, there is a growing gap between ambition and delivery on adaptation.

7. Existing adaptation governance arrangements face challenges in meeting current adaptation needs and are even less equipped to address the additional complexities associated with adapting to climate tipping points. Current adaptation frameworks have limited capacity to systematically consider:
   - abrupt and non-linear climate changes
   - systemic and compound risks
   - cascading and transboundary climate impacts
   - overshoot scenarios in which global temperatures temporarily exceed the 1.5-degree C temperature limit.

8. Data and information gaps remain a major challenge for implementing adaptation, particularly in developing countries where climate impacts are often underreported. Addressing these gaps will require stronger international cooperation, increased climate finance and investment in data systems, and the integration of qualitative, context-specific information to support adaptation decision-making.

9. Scientific guidance is also evolving. The Intergovernmental Panel on Climate Change (***IPCC***) is currently revising its 1994 Technical Guidelines for Assessing Climate Change Impacts and Adaptation, offering an opportunity to better integrate climate tipping point risks into planning and decision-making.[9]

B. The Case for Transformational and Transboundary Adaptation Action

Transformational Adaptation

10. Adaptation has traditionally been framed as a local challenge because climate impacts are experienced in specific places and adaptation measures are often implemented at the community, municipal, or national level.

11. However, adaptation can and should also be framed as a proactive approach that anticipates future risks and strengthens resilience before impacts occur: "transformational adaptation."[10] Some definitions of transformational adaptation describe it as a forced response to particularly rapid or extreme climate impacts and a mode for taking action to avoid crossing irreversible or undesirable climate tipping points.[11]

Transboundary Adaptation

12. Climate impacts increasingly cross national borders, affecting food systems, trade, migration, water resources, and ecosystems. Transboundary adaptation recognizes that climate risks can cascade across borders and regions through interconnected social, ecological, and economic systems.[12] Existing adaptation frameworks are largely national in scope and do not adequately address regional or transboundary risks. NAPs primarily focus on domestic action, leaving a gap in preparedness for regional and interconnected climate impacts.

13. Transboundary and transformational adaptation requires challenging the conventional narrative that adaptation is solely a local concern. While adaptation action may be implemented locally, the drivers, impacts, and consequences of climate change increasingly transcend political and geographic boundaries, requiring broader regional and international perspectives. Below is a list of sectoral examples for transboundary impacts and adaptation approaches.

14. Water scarcity: Many of the world's major river basins and aquifers are shared across national boundaries, making water availability dependent on decisions taken and climatic conditions occurring beyond a single Party's control. Climate change is expected to alter precipitation patterns, increase the frequency and severity of droughts, and intensify competition over limited water resources. There is a case to be made that adaptation requires cooperative governance arrangements, information sharing, and coordinated management approaches that recognize the interconnected nature of water systems.[13]

15. Food: Agricultural production is increasingly vulnerable to rising temperatures, changing precipitation patterns, and extreme weather events. Climate-related disruptions in one region can affect food availability and affordability elsewhere through global trade networks. As food systems become more interconnected, adaptation strategies should move beyond local production concerns and consider the resilience of regional and global supply chains, trade relationships, and food security systems.[14]

16. Health: Changes in temperature, precipitation, and ecosystem conditions can increase the spread of disease and pathogens across regions and national boundaries. New climatic conditions may allow for diseases such as malaria, dengue fever, and other illnesses to expand into new geographic areas.[15] In addition, climate-related disasters can strain health systems, increase the risk of infectious disease outbreaks, and create health challenges associated with displacement and migration. Consideration could be given to cross-border cooperation in disease surveillance, public health preparedness, and health system resilience.[16]

17. Biodiversity/ecosystems: Many ecosystems, such as forests, river basins, mountain ranges, oceans, and species habitats, span borders and provide essential ecosystem services that support livelihoods, food security, and water resources. Rising temperatures, changing precipitation patterns, ocean warming/acidity, and more frequent extreme events are disrupting ecological interactions and increasing the risk of ecosystem degradation and biodiversity loss, including deforestation. These changes can have cascading effects across regions, affecting fisheries, pollination services, water regulation, and carbon sequestration. As ecosystems become increasingly vulnerable to climate change, adaptation strategies may need to move beyond site-specific conservation measures and consider the resilience of interconnected ecological systems. Recognizing ecosystems and biodiversity as shared assets that provide benefits across national boundaries reinforces the need for greater international cooperation and integrated adaptation planning.[17]

C. Considerations for UNFCCC Workstreams/Processes and the Second Global Stocktake

18. There is broad recognition that climate overshoot of 1.5 degrees C is increasingly likely.[18] However, it may be politically challenging to discuss climate tipping points within UNFCCC processes. In the context of adaptation, does adapting to climate tipping points represent the next frontier of adaptation policy? While political conditions may not yet support negotiations on climate tipping points, Parties have expressed interest in using transboundary adaptation, systemic risk assessment, and resilience planning as pathways to begin addressing the associated risks.

19. While the global adaptation policy architecture under the UNFCCC and the Paris Agreement has made important progress, it is not fully equipped to address systemic, transboundary, and non-linear climate risks, including climate tipping points, underscoring the need for enhanced international cooperation. Parties will need to assess institutional gaps and identify how the current adaptation architecture could

evolve to better address climate tipping points, overshoot, and transboundary climate risks given overshoot is likely.

Existing UNFCCC Workstreams and Processes

20. Parties could consider which existing UNFCCC workstreams and processes could usefully or more explicitly integrate climate tipping point risks and overshoot scenarios into their mandates, planning, and implementation efforts. Below is a list of options for consideration, in no particular order.

21. Under the **GGA**, at COP31 or beyond, Parties could consider:
    - providing further guidance to the BAR to advance work on transboundary climate risks, systemic impacts, and adaptation under overshoot scenarios[19]
    - providing further guidance to the BAVA to address risks, data gaps, and regional adaptation cooperation in the operationalization of the Belém Adaptation Indicators.[20]

22. The **NAP process** could integrate climate tipping points considerations into the NAP planning process including by:
    - incorporating transboundary and systemic risk assessments into NAP development and implementation
    - encouraging the use of multiple climate and socioeconomic scenarios, including overshoot pathways
    - promoting regional adaptation planning for shared ecosystems, river basins, coastlines, and supply chains
    - strengthening technical and financial support for NAP implementation, including through expanded partnerships and capacity-building initiatives in regard to adapting to climate tipping points and transboundary adaptation.

- The **JTWP** could consider:
    - implications of temperature overshoot scenarios for communities and livelihood
    - risks associated with climate tipping points and abrupt climate impacts to societies and economies
    - social and behavioral transformations required to strengthen resilience
    - approaches for ensuring that adaptation responses remain equitable and inclusive under conditions of increasing climate risk. [21]

23. Strengthening science, data systems, and risk assessment is important for adaptation action. Within **Research and Systemic Observation,** Parties discussed climate tipping points at the 18th meeting of the research dialogue on climate scenarios. At SB64, the Subsidiary Bodies for Scientific and Technical Advice (***SBSTA***) encouraged the scientific community to continue advancing research to address knowledge and research gaps and needs related to climate tipping points.[22] Parties could consider strengthening support for research, monitoring, and early warning systems related to climate tipping points.

Second Global Stocktake

24. GST1 highlighted the importance of strengthening international cooperation to accelerate and scale up climate action.[23] Enhancing international cooperation is an important component of the GST mandate and provides an important potential hook to reframe the approach to adaptation under the GST, so as to encourage preparation for potential cross border impacts as a result of crossing climate tipping points.

25. GST1 notably "recognizes that improved understanding of how to avoid and respond to the risk of low-likelihood or high-impact events or outcomes, *such as abrupt changes and potential climate tipping points*, as well as more knowledge, support, policy and action are needed to comprehensively manage

risks of and respond to loss and damage associated with climate change impacts."[24] While this is in relation to loss and damage, this could also be read to have implications for adaptation.

26. GST1 recognized the importance of transformational adaptation, calling for "urgent, incremental, *transformational and country-driven adaptation action* based on different national circumstances." Additionally, GST1 recognized that climate change impacts are often transboundary in nature and may involve complex, cascading risks that require knowledge-sharing and international cooperation for addressing them.[25]
27. The UNFCCC Secretariat prepared a 2024 technical paper on transformational adaptation, which examined how transformational adaptation is defined and understood across sectors and scales and highlighted the growing need for system-wide responses to escalating climate risks.[26] Building on this work, Parties at the 6th Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (*CMA6*) took note of the technical paper.[27] No substantial follow up has emerged.
28. An important question is whether and how the risk of climate tipping points, transboundary and transformational adaptation could be incorporated into the GST2 processes and outcomes. The information and collection phase of GST2 will begin at COP31. Parties could consider climate tipping points during the technical assessment phase of GST2, ensuring their meaningful incorporation in GST2 outcomes.
29. The GST2 outcome could send signals or set targets to: strengthen the assessment of transboundary climate risks within adaptation planning processes; integrate these risks into NAPs; support regional adaptation initiatives and cooperative mechanisms; and build on existing frameworks and evidence, including the Adaptation Without Borders[28] and IPCC assessments of transboundary climate risks.

D. Outside the UNFCCC Process

30. At the 2024 G20 Summit Brazil President Luiz Inácio Lula da Silva proposed establishing a UN Climate Change Council to strengthen global climate governance and accelerate implementation of the Paris Agreement. The Council would seek to improve coordination across the currently fragmented climate institutions and processes while maintaining the UNFCCC and the Paris Agreement as the central fora for climate negotiations.[29]
31. Thought needs to be given—including in the context of the UN80 reform process—as to whether the overall UN climate governance structure is sufficient to respond to the possible crossing of planetary boundaries and climate tipping points. In this regard, the notion of a new UN Climate Council, as proposed by President Lula of Brazil, deserves further examination.
32. This idea merits further examination, given that the world will likely exceed the 1.5 degrees Celsius overshoot scenario, and we are one step closer to the crossing of planetary boundaries. It is clear that the UNFCCC and the Paris Agreement alone cannot coordinate a global response to climate tipping points.

E. C2ES Resources

- Considerations for the Belém– Addis Vision on Adaptation (June 2026), https://www.c2es.org/wp-content/uploads/2026/06/Considerations-for-the-Belem-Addis-Vision-on-Adaptation.pdf
- Next Steps for Belem Adaptation Indicators (March 2026), https://www.c2es.org/wp-content/uploads/2026/03/Next-Steps-for-the-Belem-Adaptation-Indicators.pdf
- After COP30, What's Next for the UNFCCC? (March 2026), https://www.c2es.org/wp-content/uploads/2026/03/after-cop30-whats-next-for-the-UNFCCC-1.pdf
- Reforming the UN for the Future of the Global Climate Regime (May 2025), https://www.c2es.org/2025/05/reforming-the-united-nations-for-the-future-of-the-global-climate-regime/
- Transformational Adaptation for COP29: Issues and Options (November 2024), https://www.c2es.org/wp-content/uploads/2024/11/Transformational-Adaptation-Issues-and-Options.pdf
- Options for a Politically Salient Headline for the GGA (November 2023), https://www.c2es.org/wp-content/uploads/2023/11/cop28-global-goal-on-adaptation-headline-options.pdf

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[3] The Organisation for Economic Co-operation and Development [hereinafter OECD], *Climate Tipping Points Insights for Effective Policy Action* (Paris, France: OECD, December 2, 2022), https://www.oecd.org/en/publications/climate-tipping-points_abc5a69e-en/full-report/component-5.html.
[4] UN Environment Programme [hereinafter UNEP], *Limiting Overshoot - Navigating exceedance of 1.5°C and pathways towards return* (Copenhagen, Denmark: UNEP, September 2, 2026), https://www.unep.org/resources/limiting-overshoot-navigating-exceedance.
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[6] Timothy Lenton et al, *The Global Tipping Points Report 2025* (Exeter, UK: University of Exeter, 2025), https://global-tipping-points.org/.
[7] UN Framework Convention on Climate Change [hereinafter UNFCCC], *Global goal on adaptation*, Decision 12/CMA.7, Annex (March 30, 2026), https://unfccc.int/sites/default/files/resource/cma2025_19_a02.pdf.
[8] A planetary boundary is a scientifically defined limit or threshold in an Earth system process that helps keep the planet in a relatively stable state. "Planetary Boundaries", Globaia, accessed September 16, 2026, https://globaia.org/boundaries/. Intergovernmental Panel on Climate Change [hereinafter IPCC], *Sixth Assessment Report, , Working Group 2 Chapter 18: Climate Resilient Development Pathways*(Geneva, Switzerland: IPCC, 2022), https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-18/.
[9] hereinafter IPCC, *Technical Guidelines for Assessing Climate Change Impacts and Adaptations* (Geneva, Switzerland: IPCC, 1994), https://www.ipcc.ch/report/ipcc-technical-guidelines-for-assessing-climate-change-impacts-and-adaptations-2/.
[10] Center for Climate and Energy Solutions [hereinafter C2ES], *Transformational Adaptation for COP29: Issues and Options* (Washington, DC: C2ES, November 2024), https://www.c2es.org/document/transformational-adaptation-for-cop29-issues-and-options/.
[11] Some definitions of transformational adaptation include both addressing the root causes of vulnerability linked to social equity and environmental sustainability and considering the scale and severity of climate impacts. Additionally, it is important to recognize that some perceive transformational adaptation as a buzzword or a concept

primarily rooted in Northern perspectives, viewing it as a potential barrier to accessing funding. This perspective might represent another point on the spectrum. Climate Investment Funds, *Principles for Transformational Climate Finance to Advance Just and Equitable Solutions* (London, UK: Climate Investment Funds, June 2023), https://www.cif.org/sites/cif_enc/files/knowledgedocuments/principles_for_transformational_climate_finance.pdf.

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[14] IPCC, *Sixth Assessment Report, Working Group 2 Chapter 5,* Food, Fibre and Other Ecosystem Products (Geneva, Switzerland: IPCC, 2022), https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter05.pdf.

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[20] C2ES, *Considerations for the Belém-Addis Vision on Adaptation* (Washington, DC: C2ES, June 2026), https://www.c2es.org/wp-content/uploads/2026/06/Considerations-for-the-Belem-Addis-Vision-on-Adaptation.pdf.

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[22] UNFCCC, *Research and Systemic Observation Draft conclusions proposed by the Chair,* FCCC/SBSTA/2026/L.5 (June 2026), https://docs.unfccc.int/documents/10000226.

[23] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5 (December 13, 2023), https://unfccc.int/documents/637073.

[24] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶ 127 (emphasis added).

[25] UNFCCC, *Outcome of the first global stocktake*, Decision 1/CMA.5, ¶¶ 51-52 (emphasis added).

[26] UNFCCC, *Defining and understanding transformational adaptation at different spatial scales and sectors, and assessing progress in planning and implementing transformational adaptation approaches at the global level* (Bonn, Germany: UNFCCC, November 2024), https://unfccc.int/sites/default/files/resource/tp2024_08.pdf.

[27] UNFCCC, *Global goal on adaptation,* Decision 3/CMA.6, ¶41 (March 27, 2025), https://unfccc.int/sites/default/files/resource/cma2024_17a01E.pdf#page=10.

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