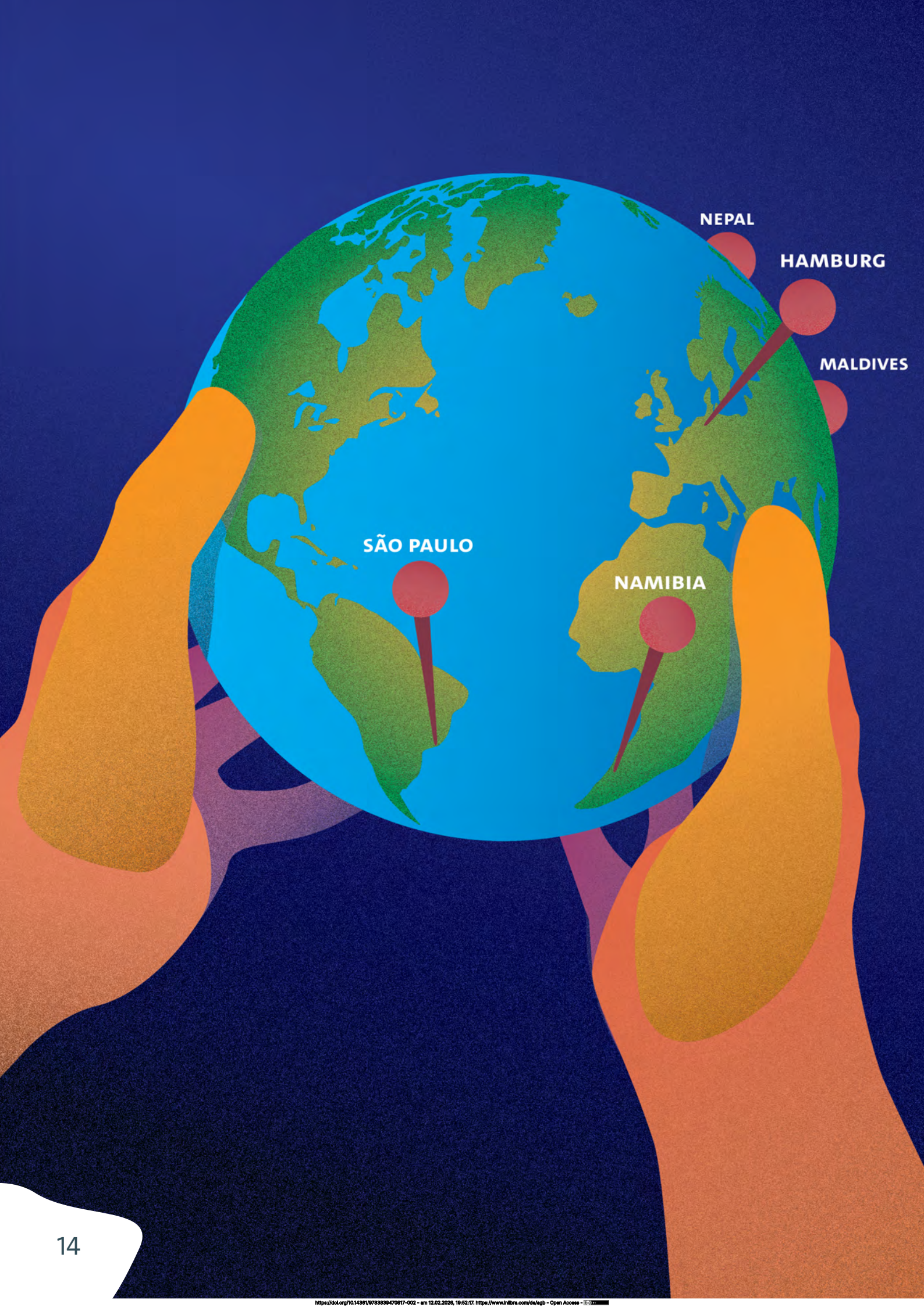

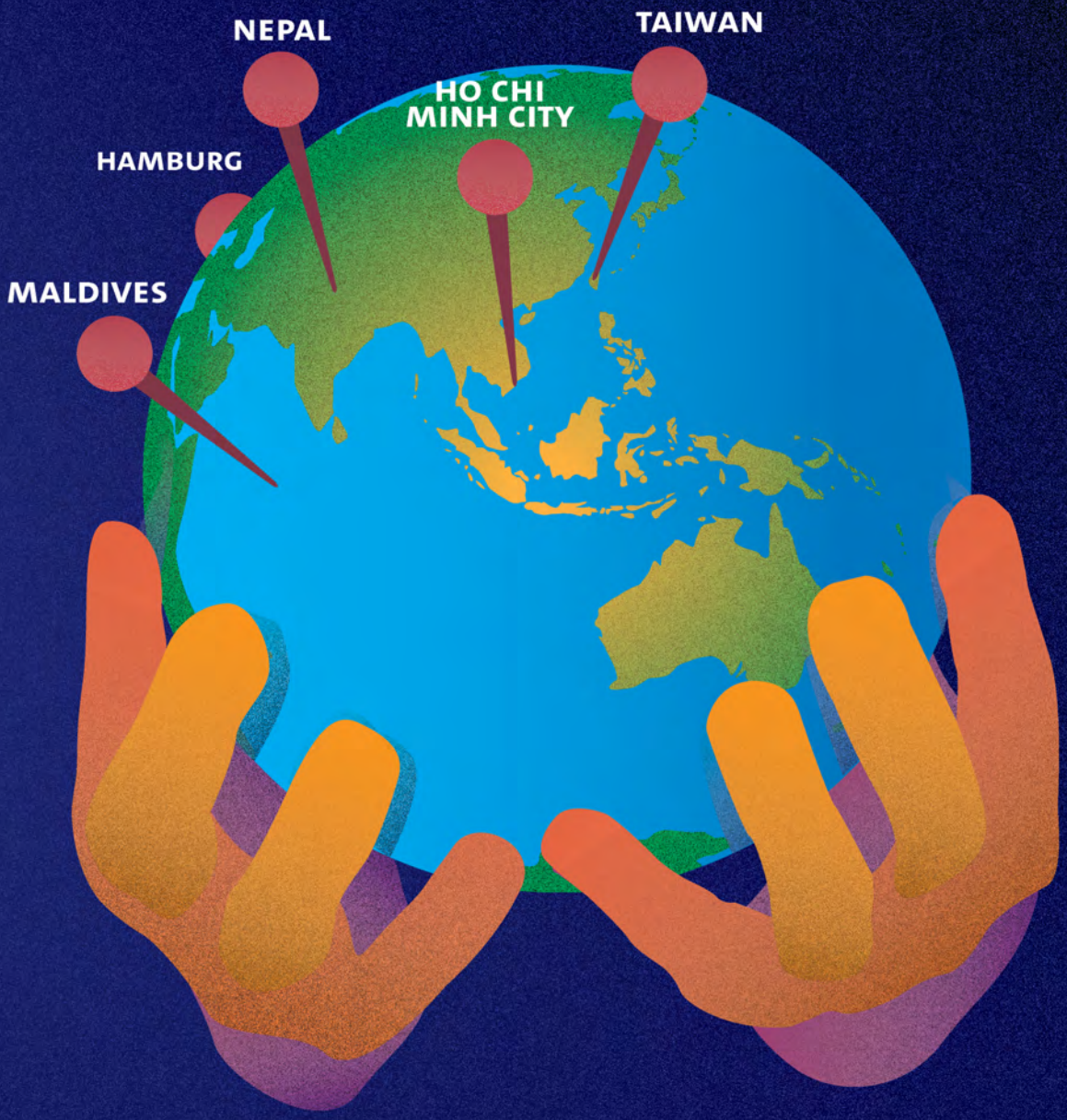


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# The Hamburg Climate Futures Outlook 2024: Goals and Structure

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With global greenhouse gas emissions still on the rise and a new record global mean temperature reached in 2023, public and policy debates focus increasingly on the needs of adaptation to the impacts of climate change. However, adaptation does not happen simply out of necessity. Whether and how local communities succeed in creating greater resilience in a world where climate change leads to more extreme weather and climate events depends on complex social conditions, which in many places are not yet met. The Hamburg Climate Futures Outlook 2024 has the goal to assess under which physical and social conditions sustainable climate change adaptation is plausible. The assessment aims at audiences in different fields and with different degrees of expertise, with Chapter 7 in particular discussing the implications of our assessment for a wider, non-expert readership and for various types of practitioners.

If neither mitigation of climate change nor adaptation to its consequences can be taken for granted, which type of climate future is awaiting human society? We, the authors, try and answer this question by assessing the plausibility of specific scenarios of how the climate changes and society changes with it in times of multiple crises, and with a global temperature rise of 1.4°C already occurring in 2023 (Copernicus, 2023). We organize the assessment into three main parts: First, we investigate if and how the world is moving toward deep decarbonization by 2050 second, we assess physical conditions of regional variability and extreme events; and third, we assess social processes that render sustainable climate change adaptation plausible.

With deep decarbonization we mean a state in which society has come down to net-zero $CO_2$ emissions. Sustainable climate change adaptation is defined as a social, political, and technical process of adjusting to actual and expected climate change and its impacts. Such a process seeks to moderate or avoid harm, reduce vulnerability, and avoid maladaptation, that is, actions that result in negative effects and increased vulnerability, by enhancing synergies and minimizing trade-offs between climate action and other sustainable development goals (Gresse et al., 2023; Juhola and Käyhko, 2023).

In our assessment, the plausibility of deep decarbonization is linked to the dynamics of 10 social drivers from the fields of politics, law, economics, and culture. These drivers are assessed in their global effects: How do these drivers affect the prospects of moving toward or away from, deep decarbonization on a global scale? What changes do we observe in the drivers' dynamics, and how do these changes affect the plausibility of a net-zero climate future by 2050? The current Outlook provides an update of previous assessments (Stammer et al., 2021; Engels et al., 2023). We will explain in detail in Chapter 3 why, according to our assessment, the world has moved further away from achieving deep decarbonization by 2050, compared to our first assessment in 2021.

Whereas global emissions and the social drivers of decarbonization can be assessed through a global framework, adaptation to the impacts of climate change is always context-specific. Accordingly, the plausibility of sustainable climate change adaptation needs to be assessed specifically for each regional or local case. In Chapter 4, we delve into the interplay between regional variability and extreme events and thereby provide a physical rationale for the varying regional and local demands to adapt to ranges of climate futures and extreme events.

In Chapter 5, we empirically scrutinize the contextual conditions that affect the plausibility of sustainably adapting to climate change in various geographical localities and regions. We look at nine case studies in urban, rural, and coastal settings across different regional contexts. The case studies—Hamburg, São Paulo, Ho Chi Minh City, Lower Saxony (Germany), Kunene (Namibia), the Nepal Highlands, the German North Sea coast, Taiwan and the Maldives—examine barriers to sustainable climate change adaptation in order to find locally specific answers to the question:

**"Under which conditions is sustainable climate change adaptation plausible?"**

Chapter 6 synthesizes and integrates the findings from the three different assessments of Chapters 3 to 5, and Chapter 7 concludes with a reflection on the implications they may bear for different types of practitioners.

The assessment provided in this Outlook thus contains three different parts that are closely interrelated. Chapter 2 explains how we integrate the different elements into a coherent whole: the plausibility of deep decarbonization, the interplay between regional variability and extreme events, and the conditions under which sustainable climate change adaptation becomes plausible.

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