

# Background document #2

Avoiding 'hard' limits to adaptation

## Introduction

This paper is one of a series of background documents informing an assessment of knowledge of loss and damage with a view to identifying priority areas for support. This assessment is being organised by the UNEP Copenhagen Climate Centre.

This background paper discusses the state of knowledge on the limits to adaptation, and in particular social and institutional factors that may be 'hard' limits to adaptation. This is related to loss and damage because the limits to adaptation are the thresholds beyond which adaptation fails to protect things that stakeholders value (Barnett et al., 2015, Tschakert et al., 2017, McNamara and Jackson 2019, Boyd et al 2021).

## Loss is not the same as damage

For the most part this paper is concerned with institutional factors resulting in non-economic losses. Non-economic losses are taken here to arise when people are dispossessed of things that they value, and for which there are no commensurable substitutes. These include tragic outcomes, such as the loss of life from climatic extremes, the loss of valued cultural artifacts that cannot be replaced, or the loss of places that give meaning to people – none of which can ever be ameliorated with by compensation. These are losses proper: the impossibility of substitutes means they cannot be protected through insurance, or adequately restored through compensation. This idea of 'loss' is distinct from the loss of or damage to things that can be more or less replaced, or whose absence can otherwise be ameliorated with money, such as impacts on infrastructure, fungible assets, or crops. Such outcomes, which we might call 'damages', can be protected through insurance, and can be compensated for through replacement, substitutes, or money.

This distinction between loss and damage suggests two quite different pathways for policy development and action. First, with respect to losses, the only morally acceptable course of action is avoidance through mitigation of greenhouse gases and through adaptation that has no limits. This is also entirely consistent with a rights-based approach to adaptation, which obliges all States to preserve the rights of all people from climate change harms regardless of cost or difficulty (Hall and Weiss 2012). It is this issue of the limits to adaptation that is the focus of this paper.

Second, with respect to damages, these too are best avoided through adaptation, but the moral imperative is perhaps lower as insurance instruments and if necessary compensation measures can provide remedy, as they often already do in the developed world. Thus, a comprehensive program of work to develop innovative insurance mechanisms that cover agriculture and fisheries and private and public assets in developing countries can do much to address the problem of damage.

## Hard and soft limits to adaptation

Adaptation is a process of adjustments in social and environmental systems to avoid or reduce the impacts of climate change, and/or to capitalize on new opportunities. It is widely recognised that given historical and unavoidable future greenhouse gas emissions the Earths' climate will change to the degree that there can be no effective response to avoid some impacts of climate change. For example, even if all countries fulfil their pledges to reduce emissions to zero by 2050 there will still be approximately 2°C of warming above pre-industrial levels, which is highly likely to cause widespread changes in climate sensitive ecosystems for which there is little scope for adaptation,

such as coral reefs and tropical glacier (Hughes et al., 2018, Stuart-Smith et al., 2021, Meinshausen et al., 2022). It is in natural systems such as these where the limits to adaptation seem 'hard', in the sense that there are few options available to humans to avoid the points at which these climate sensitive ecosystems are fundamentally damaged and some or all of their unique and valued characteristics are lost (Marshall et al. 2019, Stensrud 2020, Pörtner et al 2022).

Climate sensitive ecosystems that face hard limits have intrinsic value to people (for various reasons), resulting in losses for which there are no commensurable substitutes (Adger et al., 2013, Barnett et al., 2016). These losses can be catastrophic to people's identity and well-being (Adger et al., 2022). They can only be avoided by deep cuts in greenhouse gas emissions that allow these ecosystems to adapt in ways that retain the characteristics that people value (Pörtner et al 2022).

In some cases losses in climate sensitive ecosystems can be avoided or at least greatly delayed through reductions in non-climate stressors that increase their vulnerability to climate change. This is often the case, for example, in wetlands where human diversions of water are often a larger driver of change than climate, coasts where poorly sited and designed structures can have a bigger impact on erosion than sea-level rise, and forests where logging and habitat fragmentation can have a bigger impact on biodiversity losses than climate drivers. In these cases there are actions that humans can take to avert loss, and so the limits to adaptation are not 'hard' (there are options). In these cases the limits to adaptation may be called 'soft' in the sense that loss and damage can theoretically be averted through the use of known practices and technologies, even if they are not immediately available and their application seems unlikely (Barnett et al., 2015, Klein et al. 2015, Mechler et al., 2020, Pörtner et al 2022).

In so far as people's welfare (as opposed to well-being) depends on the ecosystem goods and services provided by climate sensitive ecosystems, there are a range of adaptations that can be made to avoid damages, most often through a combination of technologies, changes in livelihoods and improvements in social and economic opportunities (see Valdiva et al., 2012, Cinner et al., 2018). These include practices that reduce dependence on climate sensitive resources or enhance people's freedoms to adapt, such as social protections and income guarantees in times of crisis, industrial restructuring programs, improvements in infrastructure, and improvements in social opportunities. They also include technologies that reduce sensitivity to climate risk, such as technologies such as coastal defences, irrigation, and improved designs for infrastructure. These adaptations are theoretically possible, though often impeded mostly due to cost, governance systems, and social norms (Boyd et al 2021, Thomas et al 2021, Pörtner et al 2022). Thus soft limits are much the same as barriers adaptation, and it is when they are never overcome that they become 'hard' limits in that they climate impacts cause losses and damages (Barnett et al., 2015, Thomas et al., 2021).

So, the soft limits to adaptation are things that can theoretically be done to avoid loss and damage. They are socially constructed in two ways. First, because they arise from the way social systems expose some groups to climate change risks, constrain their adaptive capacities, or impede adaptation responses (Barnett et al., 2015). Second, because the things that stakeholders value and which are at risk of loss or damage are themselves the product of the shared meanings that rise from culture (Adger et al. 2009, Dow et al. 2013). They can be overcome, then, by affecting change in social systems such that adaptation is enacted and effective, or by societies choosing to devalue things at risk of loss or damage.

To further elaborate, one oft-mentioned limit to adaptation relates to 'economics', meaning, in effect, its cost. The cost of adaptation is a soft limit in that the costs of adaptation can be met should

those with the wherewithal choose to pay it. For example, it has been said that cost is a barrier to adaptation in the Marshall Islands, where the estimated cost of coastal protection is USD9 billion (net present value) (Deltares 2021). The Marshall Islands is a key strategic partner of the United States and is home to United States military facilities, in addition, the United States is legally responsible for the security of the Marshall Islands. In this context, it is notable that the cost of adaptation in the Marshall island is only 7% of the United States' commitment to build ten Ford class aircraft carriers (USD13 billion each). A similar argument about relative value can be made about adaptation globally: the UNEP Adaptation Gap report gives an upper estimate of the global costs of adaptation reaching USD 500 billion by 2050, in which case the United States' spending on COVID responses in two years alone could meet the global costs of adaptation for the next 8 years.

Thus, the claim that 'costs' are a limit is not a claim about the absolute scarcity of money for adaptation, nor is it about the calculation of costs and monetised benefits, since many of the benefits of adaptation are incommensurate with money, including for example, avoided morbidity and mortality, and the retention of values places, sovereignty, self-determination, social cohesion, culture and heritage. Rather the value of adaptation is in effect a matter of the politics of trade-offs. Indeed, making explicit otherwise hidden trade-offs in values is key to overcoming the soft limits to adaptation (Barnett et al. 2015, Pörtner et al 2022).

## Conclusions

Most social losses can be avoided by deep cuts in emissions and an ambitious program of adaptation given a) multiple drivers of vulnerability (and so multiple points of intervention), b) existing technologies and practices that, if implemented, would avoid losses. The failure to implement these technologies and practices is the cause of soft limits to adaptation. This failure is one of imagination (ideas), incentives (interests), or morality that combined mean seemingly 'soft' limits may be so institutionalised that adaptation fails to affect the changes necessary to avoid loss and damage.

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Jon Barnett (The University of Melbourne) authored this document.<sup>1</sup>

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<sup>1</sup> School of Geography, Earth and Atmospheric Sciences, The University of Melbourne, Victoria 3010, Australia:  
e-mail: jbarn@unimelb.edu.au