

# Into Unknown Territory

THE LIMITS TO ADAPTATION  
AND REALITY OF LOSS  
AND DAMAGE FROM  
CLIMATE IMPACTS

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Hakim Zadi, Pakistan floods.

Gideon Mendel/Corbis/ActionAid

Cover Page photo: Rose Ittoa, Northern Kenyan drought

Frederic Courbet/Panos Pictures/ActionAid

## SUMMARY

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**Climate change** will inflict devastating damage to land, property, ecosystems and human life. Yet loss and damage from climate impacts gets far less attention than it deserves from climate negotiators and politicians.

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The concept of loss and damage is increasingly important because we have not mitigated or adapted to climate change in time: whatever we do now, there will still be losses and irreversible impacts. Current emission reduction commitments are out of step with the scientific urgency of tackling climate change. We are likely to overshoot the critical 2°C threshold, putting the planet on a 4 to 6°C pathway of global warming. The World Bank estimates that even in a 2°C world, adaptation costs for developing countries will amount to a minimum of US\$70 billion by 2020 and to up to 100 billion a year by 2050.<sup>1</sup> These figures do not cover the costs of hard-to-measure issues such as ecosystem degradation, misery, loss of life or capacity building, and the actual costs could easily double. Recent figures for potential damage to ocean systems in a 4°C world estimate the economic cost alone at US\$2 trillion per year by the end of this century.<sup>2</sup>

While globally we are now committed to permanent and irreversible loss and damage, we can still drastically reduce the extent of climate impacts. Bigger and faster cuts to greenhouse gas emissions can reduce the amount of damage and resources needed for climate adaptation.

This paper contextualises issues around loss and damage as a result of climate change and demonstrates the urgent necessity for a range of approaches to address it through scaled up adaptation and mitigation measures.

To ensure that climate impacts on loss and damage are addressed, it is recommended that:

- 1. Developed countries** continue to urgently pursue mitigation strategies: the drivers of loss and damage must be tackled head on by shifting to low-carbon development pathways globally. Developed countries must increase their ambition level to more than 40% emission reduction below 1990 levels by 2020 and over 80% by 2050. Developed countries must provide finance, technology and capacity building to assist developing countries to invest in adaptation and disaster risk reduction and to transition their development onto low-carbon and climate-resilient pathways.
- 2. Decision-makers** must refocus existing approaches and massively scale up resources to address vulnerability, building resilience and adaptive capacity, especially of the most vulnerable people, communities and ecosystems.
- 3. Building on** existing architecture, such as the Hyogo Framework for Action (HFA) and the Cancún Adaptation Framework, climate-proofed disaster risk reduction needs to be dramatically scaled-up through infusion of financial resources.
- 4. The limits to adaptation** are increasingly going to be exceeded and the international community, recognising the precautionary principle and the role of the UNFCCC, needs to discuss proposals for mechanisms that can address rehabilitation and compensation.

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1. World Bank (2010): The Economics of Adaptation. *Final Synthesis Report*. [siteresources.worldbank.org/EXTCC/Resources/EACC\\_FinalSynthesisReport0803\\_2010.pdf](http://siteresources.worldbank.org/EXTCC/Resources/EACC_FinalSynthesisReport0803_2010.pdf)

2. Noone K. et al (2012) *Valuing the ocean: draft executive summary*, Stockholm Environment Institute, page 9: <http://www.sei-international.org/mediamanager/documents/Publications/SEI-Preview-ValuingTheOcean-DraftExecutiveSummary.pdf>

# INTRODUCTION

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Even with effective action to mitigate climate change and adapt to its impacts, some countries will experience irreversible losses. Land, property, ecosystems and communities will be affected to such an extent that a return to normal life will not be possible. In extreme cases, countries will permanently lose territory to climatic disasters and rising sea levels.

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Currently the planet is not on track to limit dangerous climate change; in fact, it's rapidly heading towards a world 4 to 6°C warmer by the end of this century compared to pre-industrial levels.<sup>3</sup> Yet the global community remains uncertain as to how it will enter and manage this unknown territory of increasing climate impacts and related loss and damage.<sup>4</sup> While there is an increasing acceptance of the necessity to reduce emissions and provide resources to enable vulnerable communities to adapt, there is no consensus as to what should happen when neither of these are enough to prevent loss, damage and disaster.

Addressing loss and damage for those suffering at the frontline of climate impacts for which they bear little responsibility is a moral imperative but it is still to be agreed as a political priority.

The first Earth Summit, held in Rio de Janeiro, which established the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, agreed that, "States shall co-operate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction."<sup>5</sup>

However, in the last 20 years little was done by those most responsible to address the impacts of climate change. While the issue of loss and damage was first raised in 1991, it gained momentum

only in 2007 at the Bali conference (see below 'A brief history of 'loss and damage' in the UNFCCC). In the climate conference at Cancún in 2010, countries finally agreed to launch a two-year work programme to consider approaches to addressing loss and damage. At the Durban climate conference in 2011, the work programme was structured under three thematic areas:

- assessing the risk,
- discussing the range of approaches to address loss and damage,
- exploring the role of the UNFCCC<sup>6</sup> in enhancing the implementation of these approaches.

The work programme aims to be concluded in a few months and will be further discussed at the Doha conference (COP18) in November/December 2012.

A loss and damage component to any new global agreement on climate change is critically important. In addition, there is still potential to reduce the extent of impact through mitigation and adaptation. The relationship between mitigation, adaptation and loss and damage is straightforward: bigger and faster cuts to greenhouse gas emissions now will reduce the amount of resources that are needed in order to adapt to climate impacts.

Communities and ecosystems are already suffering from the impacts of climate change. Limiting global warming to below 2°C, the global target, recommended by the Intergovernmental Panel on Climate

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3. International Energy Agency (2011) *World Energy Outlook 2011*, Factsheet, page 1: <http://www.iea.org/weo/>

4. See [http://unfccc.int/adaptation/cancun\\_adaptation\\_framework/loss\\_and\\_damage/items/6056.php](http://unfccc.int/adaptation/cancun_adaptation_framework/loss_and_damage/items/6056.php) for information on loss and damage under the UNFCCC.

5. UN (1992): *Rio declaration on environment and development. Principle 13*. <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

6. United Nations Framework Convention on Climate Change.

Change, and enabling at-risk communities to adapt to climate impacts as far as possible, limits the amount of loss and damage they will suffer.<sup>7</sup>

Mitigation needs to be swift and deep, adaptation needs to be resourced wholeheartedly through public finance and focused on the most vulnerable women, men and children, rather than on the preserve of wealthy elites and their unsustainable lifestyles.

This document aims to raise the urgent necessity of addressing the issue of loss and damage and provides further essential context to the debate

and discussions in the ongoing work programme on loss and damage. It explains why we need to tackle the challenge with interrelated actions, as neither adaptation nor mitigation alone can address the extent of climate impacts. The document contains recommendations for policy and decision-makers both in the UNFCCC and beyond. It refers to both the loss and damage mechanism, but also to how some climate impacts can still be prevented from becoming irreversible through adaptation and mitigation strategies. The text boxes bring the issues to life by illustrating the reality of climate-related loss and damage in particular contexts.

### **A brief history of 'loss and damage' in the UNFCCC**

- 1991** Vanuatu tables a proposal that asks for insurance of island states that compensates against sea-level rise. The rationale was also that putting costs on climate impacts would drive mitigation ambition. Watered down by industrialised countries, Vanuatu's proposal survives as the word 'insurance' in the UNFCCC
- 2007** The Bali Action Plan agreed at COP13 mandates Parties to explore "means to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change"
- 2008** Alliance of Small Island States (AOSIS) tables proposal for a multi-window mechanism for international loss and damage mechanism at the climate summit in Poznan (COP14)
- 2010** The Cancún climate conference (COP16) establishes a "work programme in order to consider approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change"
- 2011** In Durban at COP17, Parties agree to structure the organisation of the work programme into three thematic areas:
  - 1. Assessing the risk of loss and damage associated with the adverse effects of climate change and the current knowledge on the same**
  - 2. A range of approaches to address loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather events and slow-onset events, taking into consideration experience at all levels**
  - 3. The role of the Convention in enhancing the implementation of approaches to address loss and damage associated with the adverse effects of climate change**
- 2012** Subsidiary Body for Implementation is due to make recommendations on loss and damage at the climate summit in Qatar (COP18).
- 2015?** Future: loss and damage component is part of a new global agreement on climate change.

**For more details visit: [http://unfccc.int/adaptation/cancun\\_adaptation\\_framework/loss\\_and\\_damage/items/6056.php](http://unfccc.int/adaptation/cancun_adaptation_framework/loss_and_damage/items/6056.php)**

7. Many vulnerable countries increasingly demand well below 1.5°C as the limit for temperature rise.



## THE CLIMATE CONTEXT

There are a number of studies that examine governments' mitigation commitments up to 2020, which all use slightly different methodologies. The UNEP report *Bridging the Emissions Gap* is at the conservative or optimistic end and projects a gap of between 6-11 gigatonnes of carbon dioxide equivalent emissions in 2020, resulting in a global average temperature rise exceeding 2°C.<sup>8</sup> Climate Action Tracker is more specific in its projection of global warming and puts the 2100 global mean temperature increase between 2.9°C and 4.4°C if current commitments are implemented.<sup>9</sup>

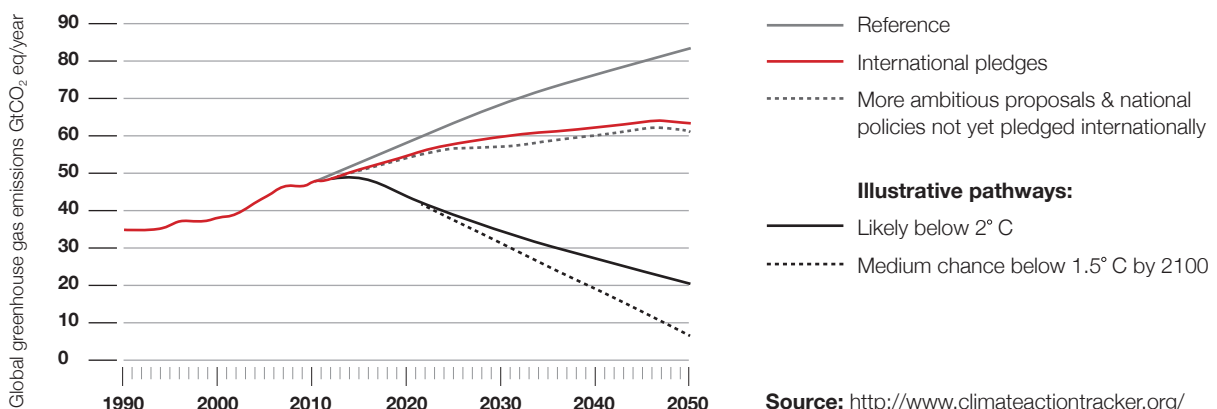
The International Energy Agency (IEA) factsheet *World Energy Outlook* presents a 'new policies' scenario in which world primary demand for energy increases by one-third between 2010 and 2035, resulting in a 20% increase in energy-related CO<sub>2</sub> emissions – and therefore a global temperature rise in excess of 3.5°C.<sup>10</sup> Current trends would mean a doubling of energy-related emissions by 2050 – the consequence would be a climate 6°C warmer. The IEA points out that four-fifths of total energy-related CO<sub>2</sub> emissions permissible by 2035 are already 'locked in' by existing capital stock such as power plants and buildings. Stringent new action is

needed by 2017 to ensure future space for growing energy consumption without breaching the 2°C threshold.<sup>11</sup>

Finally, in addition to pledges and an examination of other climate-relevant policies, we can use historic trends to project likely future outcomes. The long-term trend in global CO<sub>2</sub> emissions report shows that in 2010 growth in global CO<sub>2</sub> emissions, "returned to the long-term historic trend".<sup>12</sup> Furthermore, if current trends continue then, "China will overtake the USA by 2017 as the highest per capita emitter among the 25 largest emitting countries".<sup>13</sup>

We can therefore be relatively certain that unless the world rapidly changes course towards sustainable consumption and development choices, and governments increasingly adopt more stringent mitigation proposals than are currently pledged, we are then heading towards a planet that will have warmed by a global average of 4 to 6°C by the end of this century. The graph below shows possible emission pathways for both business-as-usual scenarios and for staying below 2°C.

**Figure 1: Potential future emission pathways**



8. UNEP (2011) *Bridging the Emissions Gap*, United Nations Environment Programme, page 8: [http://hqweb.unep.org/pdf/UNEP\\_bridging\\_gap.pdf](http://hqweb.unep.org/pdf/UNEP_bridging_gap.pdf)

9. Climate Action Tracker: <http://www.climateactiontracker.org/>

10. International Energy Agency (2011) *World Energy Outlook 2011*, Factsheet, page 1: <http://www.iea.org/weo/>

11. International Energy Agency (2011) *World Energy Outlook 2011*, Executive Summary, page 2: <http://www.iea.org/weo/>

12. Olivier J.G.J., Janssens-Maenhout G., Peters J.A.H.W. and Wilson J. (2011) *Long-term trend in global CO<sub>2</sub> emissions*, 2011 report, The Hague: PBL/JRC, page 9: [http://www.pbl.nl/sites/default/files/cms/publicaties/C02%20Mondiaal\\_%20webdef\\_19sept.pdf](http://www.pbl.nl/sites/default/files/cms/publicaties/C02%20Mondiaal_%20webdef_19sept.pdf)

13. Olivier J.G.J., Janssens-Maenhout G., Peters J.A.H.W. and J. Wilson (2011) *Long-term trend in global CO<sub>2</sub> emissions*, 2011 report, The Hague: PBL/JRC, page 12: [http://www.pbl.nl/sites/default/files/cms/publicaties/C02%20Mondiaal\\_%20webdef\\_19sept.pdf](http://www.pbl.nl/sites/default/files/cms/publicaties/C02%20Mondiaal_%20webdef_19sept.pdf)

## LOSS AND DAMAGE IN A WARMER CLIMATE

A recent Special Report by the Intergovernmental Panel on Climate Change (IPCC) examining climate-related disasters found that, “fatality rates and economic losses expressed as a proportion of GDP are higher in developing countries”. Between 1970 and 2008, “over 95% of deaths from natural disasters occurred in developing countries”.<sup>14</sup> Climate change impacts are already unfolding and will have an increasingly greater impact on men and women living in poverty.

A number of countries would no longer physically exist in a 4°C world and even at much lower levels of global warming would face severe impacts. Low-lying atoll communities, such as the Maldives and Kiribati, are especially vulnerable; 80% of the islands of the Maldives lie one metre or less above sea level.<sup>15</sup> Recent studies predict that sea levels could rise by up to two metres by 2100.<sup>16</sup> In such a scenario there will be devastating impacts for many low lying countries, coastal regions and cities. For example, most of the Maldives would be uninhabitable and its population would have to relocate.

Analysis shows that in developing countries, even with only moderate changes in sea levels, inundation of agricultural land in coastal areas would double the coastal populations at risk.<sup>17</sup> Some countries are particularly affected. For example, it is estimated that a 1.5 metre rise in sea level could displace as many as 17 million people in Bangladesh.<sup>18</sup>

Of course, an average of 4°C of global warming masks sharp regional variations. Recent projections suggest that with an increase in the global average of 4°C, such a warmer world would actually lead to increases in Sub-Saharan Africa of temperature rises of up to 7°C, the Amazon rainforest 8°C and the Arctic an incredible 16°C.<sup>19</sup> Similarly, global averages mask the differentiated impact on men and women around the world. Women form a disproportionately large share of the poor in countries all over the world. Women in rural areas in developing countries are highly dependent on local natural resources for their livelihood, because of their responsibility to secure water, food and energy for cooking and heating. The effects of climate change, including drought, uncertain rainfall and deforestation, make it harder to secure these resources. By comparison with men in poor countries, women face historical disadvantages, which include limited access to decision-making and economic assets that compound the challenges of climate change.<sup>20</sup>

Much of Sub-Saharan Africa is forecast to experience a reduction in the length of the growing season, with a reduction of at least 20% by 2100. East Africa is expected to suffer a 20% loss in maize yields, while West Africa is predicted to suffer a staggering 90% cut in its bean production. This reflects the likelihood that in a 4°C world more than one-third of current cropland in east and southern Africa would be unsuitable for cultivation.<sup>21</sup>

14. IPCC (2012) *Managing the risks of extreme events and disasters to advance climate change adaptation*, page 9: [http://ipcc-wg2.gov/SREX/images/uploads/SREX-All\\_FINAL.pdf](http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf)

15. IPCC (2012) *Managing the risks of extreme events and disasters to advance climate change adaptation*, pages 512-513: [http://ipcc-wg2.gov/SREX/images/uploads/SREX-All\\_FINAL.pdf](http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf)

16. Allison I. et al (2009) *The Copenhagen Diagnosis: Updating the world on the latest climate science*, The University of New South Wales Climate Change Research Centre (CCRC), Sydney, Australia, page 7: [http://www.ccrcc.unsw.edu.au/Copenhagen/Copenhagen\\_Diagnosis\\_LOW.pdf](http://www.ccrcc.unsw.edu.au/Copenhagen/Copenhagen_Diagnosis_LOW.pdf)

17. Dasgupta S. et al (2011) Exposure of Developing Countries to Sea Level Rise and Storm Surges, *Climate Change*, 106: 567-579

18. Mainstreaming Adaptation to Climate Change in Coastal Bangladesh by building Civil Society Alliances <http://pubs.iied.org/pdfs/G00016.pdf>

19. UK Met Office, Four degree interactive map: <http://www.metoffice.gov.uk/climate-change/guide/impacts/high-end/map>

20. 52nd session of the Commission on the Status of Women (2008) ‘Gender perspectives on climate change’, Issues paper for interactive expert panel on Emerging issues, trends and new approaches to issues affecting the situation of women or equality between women and men. <http://www.un.org/womenwatch/daw/csw/csw52/issuespapers/Gender%20and%20climate%20change%20paper%20final.pdf>

21. Thornton P.K. et al (2011) Agriculture and food systems in sub-Saharan Africa in a 4° C+ world, The Royal Society, pages 120-123: <http://www.agriskmanagementforum.org/farmd/sites/agriskmanagementforum.org/files/Documents/ag%20and%20food%20systems%20in%20SSA%20in%20a%204C+%20world.pdf>

The IPCC Fourth Assessment report states that for increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services such as water and food supply.<sup>22</sup> The report highlights that: approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C; and, as global temperatures exceed 4°C above pre-industrial levels, model projections

suggest significant extinctions (40-70% species assessed) around the globe.<sup>23</sup>

Ocean ecosystems are already under threat from multiple stressors and would face devastating impacts in a 4°C world. A new study suggests an economic cost alone of US\$2 trillion per year by the end of this century.<sup>24</sup>

The triggering of tipping elements of the climate system, thresholds where large-scale change in the earth system becomes irreversible, are much more likely in a 4°C world. These include irreversible melt of polar caps, die-back of the Amazon forests, or switch in the Asian monsoon regime.<sup>25</sup>



22. IPCC (2007) Summary for Policymakers, in M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK, 7-22
23. Fischlin A., Midgley G.F., Price J.T., Leemans R., Gopal B., Turley C., Rounsevell M.D.A., Dube O.P., Tarazona J. and Velichko A.A. (2007) Ecosystems, their properties, goods, and services, in M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, 211-272
24. Noone K. et al (2012) *Valuing the ocean: draft executive summary*, Stockholm Environment Institute, page 9: <http://www.sei-international.org/mediamanager/documents/Publications/SEI-Preview-ValuingTheOcean-DraftExecutiveSummary.pdf>
25. Lenton T.M., Held H., Kriegler E., Hall J.W., Lucht W., Rahmstorf S. and Schellnhuber H.J. (Feb 2008) Tipping elements in the Earth's climate system (Free full text), *Proceedings of the National Academy of Sciences* 105 (6): 1786-1793. Bibcode 2008PNAS..105.1786L. doi:10.1073/pnas.070541410



## Loss and damage causes migration

Population displacement is often mentioned as a likely outcome of failing to tackle climate change effectively. In extreme scenarios the loss of habitable land from climate impacts will result in a mass transfer of people from affected areas. Globally, the International Organization for Migration suggests that in a 4°C world the commonly cited estimate of 200 million people displaced by climate change by 2050 could 'easily be exceeded'.<sup>26</sup> The government of Bangladesh is already forecasting that more than 20 million of its people could be forced to move as a result of rising sea levels coupled with an increasing number of cyclones and storm surges. Such predictions are accompanied by a warning that the already densely populated country will be unable to absorb such large numbers of displaced people; international migration will be an obvious outcome.<sup>27</sup>

Climate-induced migration is usually portrayed as a possible future event rather than something happening now. However, a new study by ActionAid Bangladesh finds that internal migration is already increasing but the nature of migration is a more complex phenomenon than is usually understood. Men from at-risk communities already move on a seasonal basis in search of employment in urban areas but climate change is extending the length of time they spend away from their families. For example, prolonged drought in Naogaon has made agriculture a more uncertain activity than previously and salinity-induced diseases in Khulna region have introduced a new social stigma, making marriage within the community impossible for young women.<sup>28</sup>

There is also a clear relationship between the poverty of the individual migrant and the extent to which relocation is a success. Relatively wealthy and educated people are able to plan for a new permanent home away from slow-onset disaster areas. But poorer people tend to lack the resources and social networks to plan effectively. In fact, poorer people are faced with a double dilemma: they are more directly reliant on ecosystem services but less able to diversify their incomes in advance of an environmental disaster.<sup>29</sup> Furthermore, there are practical difficulties associated with migration: children, pregnant women, the disabled and the elderly may find the journey itself challenging, if not impossible.

Internal migration, particularly if it is unplanned, is not just disruptive for the individuals undertaking it but can also have adverse effects on the recipient community. Displaced people often end up living in refugee camps or urban slums.<sup>30</sup>

**The choice for policymakers is not between no migration and mass migration but between organised, safe migration and chaos. The loss and damage agenda needs to take into account population movements resulting from climate impacts and find ways to assist those on the frontline to lead a safe and secure life. This will require cross-border cooperation and international support.**

26. Brown O. (2008) Migration and climate change, International Organization for Migration, Geneva, page 29: [http://publications.iom.int/bookstore/free/MRS-31\\_EN.pdf](http://publications.iom.int/bookstore/free/MRS-31_EN.pdf)

27. MoEF (2009), Bangladesh Climate Change Strategy and Action Plan 2009, Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh, page 17: [http://cmsdata.iucn.org/downloads/bangladesh\\_climate\\_change\\_strategy\\_and\\_action\\_plan\\_2009.pdf](http://cmsdata.iucn.org/downloads/bangladesh_climate_change_strategy_and_action_plan_2009.pdf)

28. Shamsuddoha, Md, Khan, SM Munjurul Hannan, Hossain, T, and Raihan S (2011), Displacement and migration from the climate hot-spots: causes and consequences, Centre for Participatory Research and Development and ActionAid Bangladesh, Dhaka, pages 30-31.

29. Shamsuddoha, Md, Khan, SM Munjurul Hannan, Hossain, T, and Raihan S (2011), Displacement and migration from the climate hot-spots: causes and consequences, Centre for Participatory Research and Development and ActionAid Bangladesh, Dhaka, pages 34-35.

30. Shamsuddoha, Md, Khan, SM Munjurul Hannan, Hossain, T, and Raihan S (2011), Displacement and migration from the climate hot-spots: causes and consequences, centre for Participatory Research and Development and ActionAid Bangladesh, Dhaka, pages 38.

## Lost and damaged ecosystems and their human impact

The destruction of the natural environment not only results in the loss of plants and animals – significant in themselves – but impacts on human life and livelihoods through changes to ecosystem function and the availability of ecosystem goods and services that people depend upon. Many ecosystems are already under pressure from global change drivers such as changes in land use, pollution and over-exploitation of resources; climate change compounds these and also threatens ever-greater levels of ecological devastation, often with multiple threats acting together. The current rate of extinction is 100-1,000 times what is normal, and is increasing.<sup>31</sup>

Ecosystems such as coral reefs, aquatic freshwater habitats and wetlands, mangroves, Arctic and alpine environments, and cloud forests are particularly vulnerable to the impacts of climate change. Consequences of climate change will be experienced in different ways, such as species loss; increases in invasive species; increased human-wildlife conflict (as humans and wild species compete for the same dwindling resources such as water and grazing); increased wild fires; the emergence and increased spread of pathogens (affecting wildlife, humans and livestock); and reduced ecosystem services such as freshwater availability.<sup>32,33</sup> Many of these impacts will have significant social, cultural and economic consequences, often affecting the poorest and most vulnerable people first and most severely.

Coral reefs represent some of the most biologically diverse ecosystems on earth, providing critical habitat to approximately 25% of marine species. In addition, these ecosystems provide economic benefits through tourism and fisheries. One recent estimate valued the annual net economic benefits of the world's coral reefs at US\$30 billion. However, human activities including development in coastal areas, over-fishing, and pollution have contributed to a global loss of over 10% of these valuable ecosystems; an additional 15% have been lost due to warming of the surface ocean.

Climate change will further contribute to coral reef degradation in the decades ahead, including through rises in ocean temperatures increasing the number of coral bleaching episodes; through increases in atmospheric concentrations of carbon dioxide from fossil fuel combustion driving changes in surface ocean chemistry (ocean acidification); and through the effects of global climate change combining with more localised stresses to further degrade coral reef ecosystems. Multiple environmental management strategies, from local to global, will be necessary to ensure the long-term sustainability of the world's coral reef ecosystems.

Nearly 40% of the people on earth live within 100km (60 miles) of a coastline, and many local and regional economies are based on goods and services provided by coastal ecosystems. An evaluation of potential impact shows coral bleaching led to an estimated loss of US\$0.5 - 3.0 million in 1998/99 tourism-related revenues in the Maldives.<sup>34</sup> Wider services include coastal protection, which benefits people and other ecosystems. Mangrove systems, for example, often develop in quiet near-shore environments protected by reefs and are highly productive nurseries for many important marine species. Loss of reefs as both biological and structural entities would impoverish the marine biota and potentially reduce the large-scale resilience of tropical and subtropical marine ecosystems.<sup>35</sup>

31. Pimm, S.L., Russell, G.J., Gittleman, J.L. and Brooks, T.M. (1995) the future of biodiversity. *Science* 269:347-350.

# THE LIMITS AND POTENTIAL COSTS OF ADAPTATION

Even in an ideal world, with perfect information and resources, there are limits to the extent that human systems and ecosystems can adapt to external changes. The 2°C limit was developed by IPCC with this imperative in mind, referring to historic temperature change that fell in the ambit of civilisation's ability to adapt, even though many vulnerable countries increasingly call for recognition that even changes of 1.5 degrees pose grave threats to their societies and ecosystems. In a 4°C world we are likely to see widespread exceeding of adaptation thresholds, on individual, community, societal and ecosystem levels.

One determinant of how much loss and damage will ultimately transpire is the level and effectiveness of funding to enable communities and ecosystems to adapt. In Copenhagen in 2009 developed countries agreed to provide a total of US\$30 billion to enable developing countries to make a 'fast start' to mitigation and adaptation in 2010–12 a figure far from yet being delivered. They also set themselves a target to raise US\$100 billion a year by 2020 for developing countries from a range of sources, including both public and private money.<sup>36</sup>

The ambiguous nature of both commitments has made tracking progress difficult but in any case

they fall a long way short of the amounts needed to successfully tackle climate change. The World Bank estimates that in a 2°C world, adaptation costs for developing countries will amount to around US\$70 billion by 2020 and up to US\$100 billion a year by 2050.<sup>37</sup> Other research suggests that this is a very conservative figure and that the actual costs could be far higher.<sup>38</sup>

The World Bank and the US Geological Survey estimated that economic losses worldwide from natural disasters in the 1990s could have been reduced by US\$280 billion if US\$40 billion had been invested in preventive measures. They also estimated that every dollar spent on risk reduction can save \$7 in relief and repair costs. The Stern Review forecast that the costs of tackling climate change amounted to around 1% of GDP per year, though this is dwarfed by the 20% of GDP cost of not tackling it.<sup>39</sup> The lead author, Nicholas Stern, subsequently revised his cost estimate to around 2% of GDP per year and states that the costs of not tackling climate change are also expected to increase as impacts escalate.<sup>40</sup>

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## CONCLUSIONS AND RECOMMENDATIONS

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The report highlights that impacts from climate change and global warming are already being felt and will become increasingly inevitable in the future without deep and rapid emissions reductions coupled with scaled up support for adaptation. It is crucial to tackle the drivers of loss and damage through adaptation and mitigation to minimise loss and damage. However, given the severity of climate change and the lack of mitigation ambition, then poor and vulnerable communities and countries must face the reality that there will be loss and damage which cannot be avoided. Addressing this requires a range of approaches on different levels, which will have to be explored in order to assist the most affected in coping with the loss and damage. For designing such approaches, it is crucial to identify the specific needs encountered in the affected developing countries, and to massively scale up responses by the international community. The following section outlines a range of emerging recommendations:

### 1. Prevention is better than cure

The drivers of loss and damage must be tackled head on. The current low ambition levels of emission reductions are taking us to a 4°C warmer world. We need a rapid global transition to low-carbon and climate-resilient development pathways. This includes measures to ensure the swift decarbonising of economic activities in developed and emerging economies. Developed countries must agree targets of at least 25-40% below 1990 levels by 2020 and increase their ambition level to more than 40% and over 80% by 2050. All developed countries must move to the high end of their current pledges and show how their targets are consistent with decarbonising their economies by 2050. Developed countries must provide finance, technology and capacity-building to assist developing countries to invest in adaptation and disaster risk reduction and to transition their development onto low-carbon and climate-resilient pathways. Simultaneously, developing countries need to strengthen forward-looking planning and development to

adapt and manage loss and damage-related exposures and vulnerabilities.

### 2. Preparedness is critical: invest urgently in Disaster Risk Reduction

Governments need to get ahead of the curve; preparedness is critical. The disaster risk reduction community currently largely focuses on weather variability and has, consequently, given less attention to slow-onset issues. The progress made in disaster risk reduction has laid the foundation and generated considerable learning for adaptation programming. For disaster risk reduction (DRR) to be successful in the changing climate, it needs to also focus on longer-term impacts, such as sea-level rise, desertification, loss of biodiversity, impacts on humans, etc in order to prepare for a 4°C world. The capacity of risk managers (at different scales) to include climate threats in their analyses and responses needs to be significantly enhanced. Building on existing architecture, such as the Hyogo Framework for Action (HFA) and the Cancún Adaptation Framework, climate-proofed disaster risk reduction needs to be dramatically scaled-up through provision of financial resources.

### 3. Managing uncertainty and unpredictability requires new approaches

It is time to scrap the illusion that more information is all that is needed for people to cope with a 4°C world. Instead, decision-makers need to refocus their approaches to addressing vulnerabilities and building resilience and adaptive capacity, especially of the most vulnerable people, communities and ecosystems. Such new approaches, which recognise social-ecological systems and their interdependence, are urgently needed, instead of a very specific hazard focus and countermeasures on climate impacts. Development strategies must empower communities to deal with an uncertain and unpredictable world. Flexibility, regular reviews, adaptive management and learning must be seen as an integral part of planning and response.

#### **4. Address loss and damage beyond adaptation**

The limits of adaptation are going to be increasingly surpassed, especially in the world's vulnerable countries, communities and ecosystems. Compensation for harmful activities is a principle of law and a regulatory gap in the existing earth governance system. The international community, recognising the precautionary principle and the role of the UNFCCC, needs to discuss proposals for mechanisms which can address rehabilitation and compensation. Pricing compensation would let polluters factor in the true costs of pollution and could leverage additional pressure to scale-up mitigation, in particular in those countries with the largest historic and future responsibilities for causing climate change.

#### **5. Scale up risk assessments**

In-country risk and impact assessments need to be strengthened. Countries have different assessment requirements for climate risk management. The recently agreed National Adaptation Plan (NAP), which, in particular, least-developed countries are supposed to undertake in the next years, could be one of the ways to integrate risk assessment into the planning process. A system should be established to aggregate risk and impact assessments to the global level. Summarising the impacts in the UNFCCC process should inform and influence negotiations at international level, with regard to both the scale of mitigation as well as the scale of adaptation support and, potentially, options to address residual damage.

Pilot schemes could be launched to undertake national asset inventories that rank countries' assets against their climate vulnerability. Assistance should be given to developing countries so they can conduct further assessments, for example through a detailed map of their geographic areas and communities at risk of catastrophic climate impacts under a range of scenarios to inform their national decision-making.

Capacity-building needs, especially for least-developed countries and small island developing states,

should be addressed. Innovative approaches such as regional or global pools of professionals for risk management that could serve countries should be considered. The UNFCCC process can play an important role in mapping and coordinating such activities.

#### **6. Adopt approaches to address loss and damage**

National Adaptation Plans (NAPs) and similar strategies should take into account potential failure of adaptation and risk reduction planning to avoid loss and damage. Climate risk management is, therefore, a key component of adaptation plans and strategies. The loss and damage work programme could develop guidance and recommendations, closely coordinated with the NAP process, on how to best establish such climate risk management.

New approaches that go beyond the national level should be developed. One example is an international or a set of regional risk management facilities that could provide risk management and insurance for poor countries. Regional or global approaches should be discussed if they enhance cost effectiveness and contribute to wider resilience-building. Importantly, such facilities should include elements of solidarity like support for the most affected while ensuring the accountability of the international community.

At this stage, a range of approaches to address loss and damage should be piloted at national level and also, wherever appropriate, at trans-boundary level. Developing countries most at risk should design schemes to aid the most vulnerable communities and assist their rehabilitation or relocation, with support from the international community where required.

#### **7. Scale up implementation and capacity-building through climate finance**

Addressing loss and damage through mitigation and adaptation actions is clearly within the mandate

of international climate finance. Developed countries promised to increase their climate finance in the years to come, without providing a clear pathway towards achieving the goal of US\$100 billion annually by 2020. A few channels already exist under the UNFCCC system, for the example the Adaptation Fund and the Least Developed Countries Fund, which can be used to jumpstart action on loss and damage. The new Green Climate Fund, once it is fully set up, should be given capacity and filled up so that it can leverage the necessary quantum leap in financial support for poor countries. They must be able to go beyond a few small projects and allow for the implementation of forward-looking strategies (such as the NAPs) and broader programmes. Mechanisms to raise revenues from innovative sources such as from international aviation, maritime transport and financial transaction tax need to be pursued.

### **8. Anchor loss and damage as a component of the 2015 agreement**

The ‘ultimate objective’ of the UNFCCC, “to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”,<sup>41</sup> is at risk. It is, therefore, all the more pressing that new international agreements recognise the dangerous impact that climate change is already having on at-risk communities and ecosystems, and enact measures to both reduce risks of and respond effectively to the adverse effects. The Convention should provide the framework for addressing climate-related loss and damage and scaling up required actions, as outlined before. Loss and damage, with its different dimensions, will need to be a core part of the new

global agreement on climate change and therefore needs to be considered seriously in the Durban Platform process towards developing a 2015 agreement.

The decision from the Durban conference stated the “need to explore a range of possible approaches and potential mechanisms, including an international mechanism, to address loss and damage”.<sup>42</sup> Reference was also made to the approaches contained in the Cancún Agreements, such as a climate risk insurance facility, options for risk management and reduction; risk sharing and transfer mechanisms such as insurance, including options for micro-insurance; resilience building; and approaches for addressing rehabilitation measures associated with slow onset events.<sup>43</sup> Substantial progress can be achieved through the UNFCCC work programme currently being implemented. The climate conference in 2012 (COP18) in Doha needs to define further steps based on the outputs of the work programme.

### **9. Loss and damage above and beyond the UNFCCC**

Climate-related loss and damage is too big an issue to be resolved only by an environmental agreement such as the UNFCCC. Issues such as human mobility or loss of territory will require consideration from other global bodies, including the UN Security Council and the UN High Commission on Human Rights Council. Nevertheless, the UNFCCC and science bodies such as the IPCC will continue to have a key role in informing other bodies. Governments and civil society must start raising the issue of loss and damage with bodies beyond UNFCCC in order to address it comprehensively.

41. *United Nations Framework Convention on Climate Change* (1992) Article 2: <http://unfccc.int/resource/docs/convkp/conveng.pdf>

42. Decision 7/CP.17, page 2

43. Decision 1/CP.16, page 6



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### **WWF**

WWF is one of the world's largest and most respected independent conservation organizations, with over 5 million supporters and a global network active in over 100 countries. WWF's mission is to stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption. [www.panda.org/news](http://www.panda.org/news) for latest news and media resources.

### **Germanwatch**

Following the motto "Observing, Analysing, Acting", Germanwatch has been actively promoting North-South equity and the preservation of livelihoods since 1991. In doing so, we focus on the politics and economics of the North with their worldwide consequences. The situation of marginalised people in the South is the starting point of our work. Together with our members and supporters as well as with other actors in civil society we intend to represent a strong lobby for sustainable development. We endeavour to approach our aims by advocating fair trade relations, responsible financial markets, compliance with human rights, and the prevention of dangerous climate change.

More information [www.germanwatch.org/en](http://www.germanwatch.org/en) Specific on loss and damage: [www.loss-and-damage.net](http://www.loss-and-damage.net)

### **CARE International**

Founded in 1945 with the creation of the CARE Package, CARE is a leading humanitarian organization fighting global poverty. CARE places special focus on working alongside poor girls and women because, equipped with the proper resources, they have the power to lift whole families and entire communities out of poverty. CARE is helping the most world's most vulnerable communities adapt to the impacts of climate change. Last year CARE worked in 84 countries and reached 122 million people around the world. To learn more about CARE's work on climate change, visit [www.careclimatechange.org](http://www.careclimatechange.org)

### **ActionAid**

ActionAid is a partnership between people in rich and poor countries, dedicated to ending poverty and injustice. We work with people all over the world to fight hunger and disease, seek justice and education for women, hold companies and governments accountable, and cope with emergencies in over 40 countries. Visit: [www.actionaid.org](http://www.actionaid.org)

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