



REDUCING THE RISKS OF  
CLIMATE OVERSHOOT

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# Priority Approaches

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03

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## 4. Responses to Possible Climate Overshoot

### Key messages

- ✓ There is a range of responses to climate change that could both lessen the possibility of overshoot and reduce its magnitude and duration if it happens.
- ✓ These responses differ considerably in effectiveness, availability, opportunities, costs, risks, and certainty.
- ✓ Cutting emissions remains the priority. Adaptation is necessary to cope with impacts. Carbon dioxide removal from the atmosphere will be needed. Solar radiation modification should be researched, and its governance discussed.



Exceeding 1.5°C would cause serious harm to people and nature everywhere, but would hurt developing countries disproportionately.<sup>36</sup> These impacts would work to slow – and possibly even reverse – development in these countries, which bear the least responsibility for climate change. This fundamental mismatch between responsibility and suffering epitomizes climate injustice.

**By the same token, climate action could bring outsize benefits to these countries, providing opportunities for greater prosperity and well-being.**

Reducing the likelihood, magnitude, and duration of overshoot, reducing the risks associated with it, and managing risks that cannot be avoided, are thus moral imperatives, as is sharing the opportunities offered by measures to stop an overshoot.

In the current context, no single approach can achieve these aims. Instead, we must rely on a combination of currently and potentially available approaches. These approaches reduce either greenhouse gas concentrations to limit the magnitude and duration of overshoot, or the impacts resulting from overshoot. Because overshoot involves considerable uncertainty, decision-makers pursuing a combination of approaches should exercise precaution, as emphasized by the Climate Overshoot Commission's Youth Engagement Group.

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### **Reduce Emissions**

The first and most important approach is to rapidly accelerate reductions of greenhouse gas emissions to stop making the problem worse. None of the other approaches discussed here changes this fact. Deep decarbonization will require much bolder and more innovative action than has been taken up to now, including phasing out fossil fuels and reorienting global climate governance. But the knowledge and

technologies necessary to slash emissions at a faster rate already exist. Turbocharging emissions reductions is the subject of Section 5.

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## Adapt

Unfortunately, even if we significantly accelerate efforts, it is highly unlikely that emissions cuts alone can prevent further severe harm from climate change. Thus, the second approach is to rapidly expand the implementation of effective adaptation measures. Many tools to enhance resilience have already proved successful, yet adaptation needs to be transformed in both qualitative terms, with novel, forward-looking initiatives, and in quantitative terms, with much greater flows of adaptation finance aligned with the SDGs. (See Section 6.)

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## Carbon Dioxide Removal

Third, to help slow the growth of the atmospheric stock of CO<sub>2</sub> – and ultimately reduce it – carbon dioxide removal (CDR), also known as greenhouse gas removal or negative emissions technologies, would need to be employed on a massive scale. Some CDR methods store carbon as organic material (such as plants, wood, or soils) and others store inorganic carbon (in the form of minerals, dissolved carbonate, or compressed CO<sub>2</sub> fluids underground). The former methods tend to be currently available and offer co-benefits while the latter have greater removal potential but will not be available at sufficient scale in the near future. Upscaling CDR in the medium term would require policies carefully designed to incentivize higher-quality CDR that promotes co-benefits – such as ecosystem restoration – and ensures permanence, with costs and opportunities distributed fairly (See Section 7.)

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## Solar Radiation Modification

Lastly, given the magnitude of the impacts expected to result from overshoot, research into solar radiation modification (SRM) should be pursued and governance approaches explored. The uncertainties and risks of such methods necessitate both of these actions. Enhancing knowledge and global discussions about SRM is the subject of Section 8.

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## Climate Finance

Although climate action often yields net benefits, it entails substantial early financial costs. A policy proposal will usually remain a mere proposal until it is funded. Section 9 thus confronts the overarching question of climate finance.

These approaches will not operate in isolation, but rather would interact with one another, sometimes in complex ways. This requires thinking about their use as integrated components of an overall strategy for reducing and managing the risks of climate overshoot, the topic of the report's conclusion.

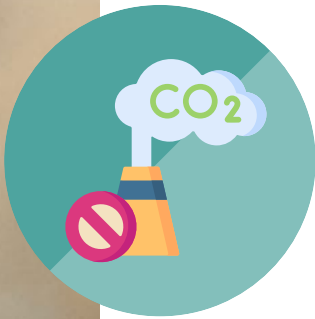
Emissions reductions must be the priority, supplemented by adaptation and carbon removal; all three of these approaches are available now and should be ramped up immediately. SRM is not available now, and may never be. Under no circumstances should it be used today – only research and governance dialogues should take place. Adopting an integrated strategy for governing risks from climate overshoot, privileging available options but also exploring those that are currently unavailable, is the subject of the conclusion of this report.



# 5. Emissions Reductions

## Key messages

- ✓ Emissions cuts must come first.
- ✓ Because the use of fossil fuels is the primary cause of climate change, fossil fuels should be phased out, through national actions coordinated internationally.
- ✓ Industrialized countries need to cut emissions most swiftly (and move towards net negative targets) to give the least industrialized countries more space to reduce poverty and pursue sustainable, low-carbon development.
- ✓ Strong international accountability and technology mechanisms are needed to ensure countries keep pace with their promised emissions trajectories.



# Background

**Greenhouse gas emissions from the burning of fossil fuels are the primary cause of climate change,<sup>37</sup> and cutting those emissions is foundational to climate action. To replace fossil fuels and make the transition to clean energy, massive new investments in renewable energy sources and other low- and no-carbon energy technologies will be necessary, enabled by widespread adoption of strong, appropriate policy instruments.**

The Climate Overshoot Commission's Youth Engagement Group wrote that "A step change in mitigation action is needed, and current rates of progress need to accelerate dramatically. Any such acceleration should foster a rapid and equitable phase-out of fossil fuel production." Phasing out fossil fuels is a substantial economic, technological and political undertaking, involving vested interests, vastly differing levels of development both between and within countries, as well as historic injustices and responsibilities.

This year's global stocktake of climate action under the Paris Agreement underlines the scale of the challenge. Even though we know what we must do, the world is still not moving nearly fast enough to limit warming to 1.5°C. Unless emissions cuts are dramatically accelerated, we will not achieve this goal.

To cut through the impasse, the Commission believes, it is important for the world to re-establish clarity about its end goals, before settling on the means to accelerate their achievement.

The first piece of clarity lies in how to think about fossil fuels – which are still continuously being promoted by the fossil fuel industry.<sup>38</sup>

Many ways to approach this challenge have been suggested, including emissions phase-out, net zero, and true zero. After consideration, the Commission settled on the objective of a "graduated, differentiated phase-out of fossil fuels."

The Commission believes the world should put the focus firmly back on fossil fuels as the main problem and cut through any ambiguity that other formulations can encourage. At the same time, the Commission emphasizes that phase-out should be graduated and differentiated because different countries and communities face very different situations.

This leads us to the second piece of clarity. The world must recognize that the transition away from fossil fuels will have different implications for developing countries, and that it should be paired with the imperatives of reducing poverty and advancing development. For that reason, the Commission argues that the richest countries need to cut emissions more deeply and more rapidly to give developing countries greater space to undertake their own transition.

For developing countries to undertake their transitions, a more enabling environment is necessary. In particular, this means mobilizing far more finance more quickly, finding innovative ways to facilitate access to low-carbon technologies, and coordinating policy instruments and fora more effectively.

At the same time, “differentiated targets” should not be seen as a blank check. That is why the Commission argues for robust international accountability, which both takes account of countries’ different trajectories and holds them to appropriate standards.

Finally, relying on carbon capture and storage (CCS) as an alternative to prompt reduction and phase-out of fossil fuels is not a viable option, although it can contribute to the energy transition in secondary ways. Using CCS to decarbonize the entire energy sector would be technically challenging and hugely expensive,<sup>39</sup> much more so than accelerating the shift to renewables that are available now for most energy uses.

## Technical characteristics

**Greenhouse gas emissions derive primarily from burning fossil fuels in the power, industrial, buildings, and transport sectors, as well as from agriculture and land use.<sup>40</sup>** (See Figure 4.)

Power plants and industrial facilities represent capital-intensive, long-term investments, so building them without emissions control technologies – which are often expensive – creates decades-long commitments to emissions.

By contrast, the costs of many low-carbon alternatives, including solar and wind energy, have sharply declined in recent years. They are now often cheaper than or at least cost-competitive with emissions-intensive technologies such as coal-fired power plants. Taking advantage of such developments may involve additional challenges, but in most cases solutions are available. For example, since renewables are intermittent sources of energy, integrating them into the power grid requires that they be accompanied by reliable, flexible baseload generation.

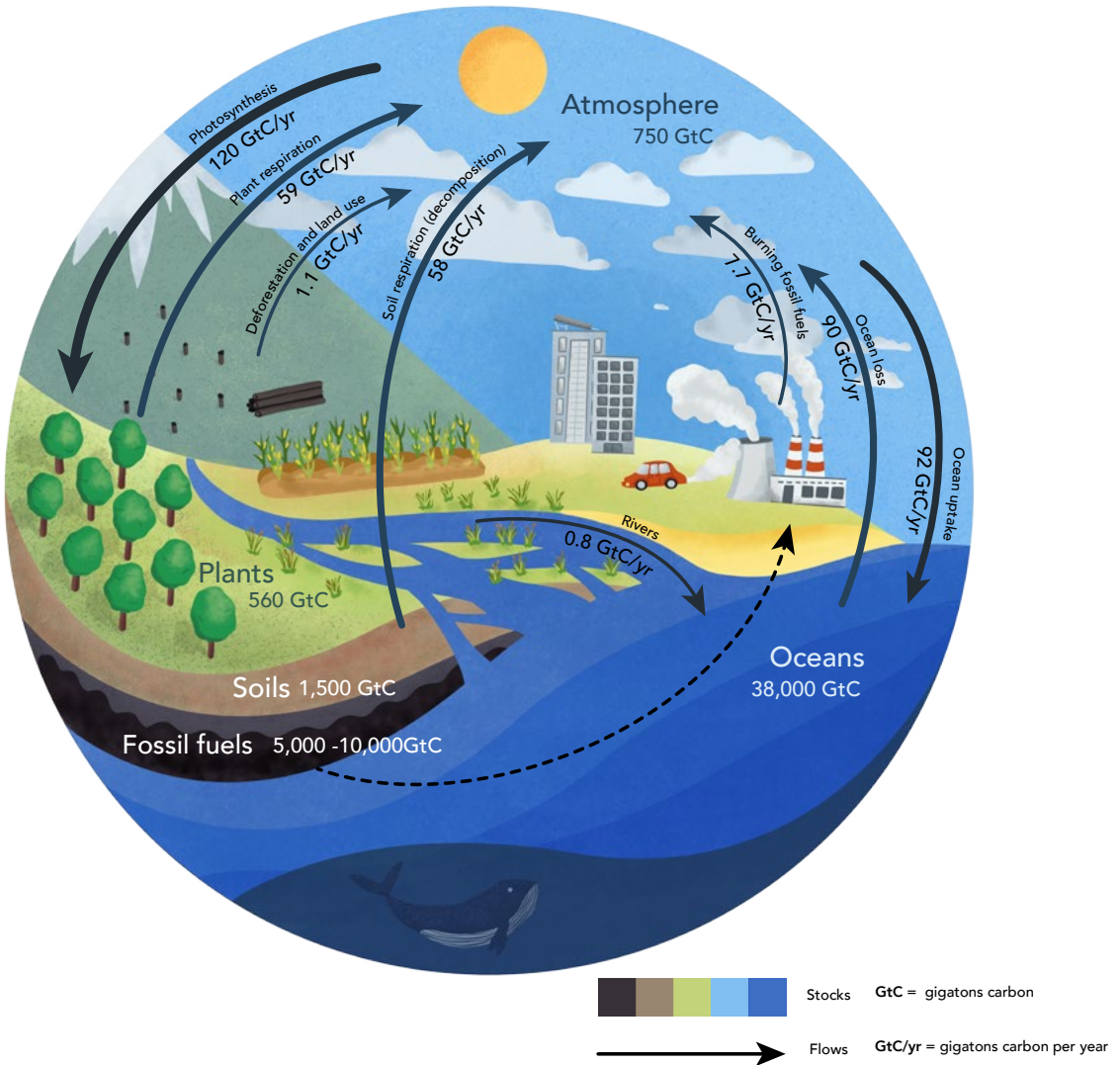
Emissions from land-use change are much smaller at a global level.<sup>42</sup> However, they are the leading emissions source for some developing countries. Most land-use change emissions come from deforestation, and most deforestation occurs in the tropics.<sup>43</sup> Deforestation not only releases CO<sub>2</sub> into the atmosphere but also destroys habitats, biodiversity, and ecosystem services.





FIGURE 4

The carbon cycle.<sup>41</sup>



Effective approaches to stopping deforestation include minimizing road intrusions into forested areas, establishing and securing protected areas, providing payments for ecosystem services, and working with the agriculture sector to promote conservation. Afforestation and reforestation can enhance carbon sequestration, locking carbon into plants and soils, as well as provide other benefits such as soil conservation, water regulation, and wildlife protection. (See Section 7.)

Other greenhouse gases and pollutants also contribute to climate change. Unlike CO<sub>2</sub>, some of these remain in the atmosphere for relatively short periods of time – days to decades. As a consequence, cutting their emissions would quickly reduce their contribution to global warming. Such “short-lived climate pollutants” – which include methane, ground-level ozone, and black carbon – offer an opportunity for action with short-term climatic benefits.<sup>44</sup>



## Governance challenges

Boosting emissions cuts requires tackling four main governance hurdles: raising ambition, strengthening accountability, clarifying responsibilities, and providing enabling mechanisms.

**First**, emissions must be aggressively cut in the short, medium, and long term, and public commitments to ambitious goals and targets are needed to maintain a dynamic pace. Based on current NDCs, the world is expected to warm by 2.6°C above pre-industrial levels by the end of the century. (See Figure 3.) Efforts to raise ambition face several obstacles. Countries' levels of development, emissions, and capabilities – historical and evolving – should be considered in global efforts. To improve coherence and effectiveness, NDCs should be reconciled with goals and targets defined by subnational governments, sectors, companies, and other actors. A wide range of policy instruments, including carbon pricing, taxation, regulation, subsidies, infrastructure investment, education, and innovation policies,

can be used to pursue more aggressive emissions cuts.

**Second**, public pledges to pursue more ambitious goals and targets will be insufficient to achieve significant cuts in emissions without strong accountability mechanisms. Under the Paris Agreement, the primary mechanism for providing accountability is the “enhanced transparency framework.” The framework does not review NDCs themselves, however, which parties are free to formulate as they see fit.

**Third**, since its creation, the principle of “common but differentiated responsibilities,” according to which developed countries bear primary responsibility for addressing climate change, has been central to the functioning





*Image credit: Antonio Garcia, Unsplash*

of international climate governance. The energy transition will be costly, and developing countries have fewer resources available to carry it out. In addition, their need to promote economic development and reduce poverty only partly overlaps with the need to decarbonize.

**Fourth**, given the capacity constraints of developing countries, several enabling mechanisms have been set up to help them cut emissions and meet their climate commitments. For example, the Climate Technology Centre and Network provides technical assistance and capacity-building to developing countries to promote diffusion of climate technologies to accelerate their energy transitions.

Technology transfer depends on climate finance. Most financial assistance is delivered through multilateral development banks, with a smaller amount provided by dedicated climate funds. Developing countries need more technology, more finance, and effective policy frameworks to ensure the technology is moved to market.

More broadly, an enabling environment at the international level is necessary to facilitate the achievement of more ambitious emissions reduction goals by all countries. For example, national climate policies have trade implications. Insufficient clarity on the comparability and compatibility of different national policies will generate trade frictions, which may impede the pursuit of more aggressive emissions reductions at the national level. Putting a price on carbon in one jurisdiction may lead to carbon leakage – when businesses transfer production to jurisdictions with laxer emission constraints – or put local producers at a disadvantage compared with producers elsewhere who are not subject to such a price.

Efforts to tackle these problems, such as the proposed Carbon Border Adjustment Mechanism of the European Union, could exacerbate trade frictions with other trading partners. Alternatively, clean energy tax credits such as those provided by the US Inflation Reduction Act may put ineligible foreign producers at a competitive disadvantage, leading to trade tensions.



# Recommendations

Deep and rapid decarbonization of the world economy will require bold, even radical action on multiple fronts, far beyond existing efforts. To this end, the Commission recommends three core strategies:

**01 First, governments should decide on a phase-out in production and consumption of all fossil fuels and accelerate their trajectories to this end, while broadening and deepening international discussions on this agenda.<sup>45</sup>**

The need for such a phase-out is now clear, although there is still resistance to it.

**To ensure justice and equity, reductions should be differentiated according to countries' needs and levels of development.** Industrialized countries, with large capacities to accelerate investment in clean energy, should first cap production and consumption of fossil fuels at current levels. This might be implemented by ceasing approval of new production facilities and large power plants, which would cause most investments in fossil fuels to end.

**Phased reductions of production and consumption (including subsidies) would follow.** These reductions should have a timeline long enough to provide confidence of technical feasibility, including for replacements, while limiting energy market disruption and the stranding of assets, which occurs when resources such as coal-fired power plants are retired before the end of their economic life. (Importantly, governments should not cover the costs of such stranded assets.)

**As phase-outs approach zero, essential-use exemptions should be provided for the hardest sectors to abate.** The phase-out should be accompanied by policy and financial measures, including public funding, to

ensure just transitions for displaced workers and impacted communities.

**Fossil fuel phase-out may begin with a small club of countries but should ultimately – and quickly – be global in scope.**

If phase-out begins with a club of countries, imports of fossil fuels and closely related products that are produced in non-participating jurisdictions should be progressively restricted. The Beyond Oil and Gas Alliance, a multi-country coalition on phasing out fossil fuels launched at COP26 in Glasgow in 2021, could be enlarged. Phase-out also has to include companies that commit, with third party verification, to absolute reductions of direct and energy-related emissions as well as ambitious targets for investments in renewables. When a critical mass of countries is achieved, governments could initiate discussions to consider an international legal instrument, fully compatible with the Paris Agreement, that would institutionalize and strengthen a graduated, differentiated phaseout of fossil fuels.

**To replace fossil fuels, the international community should simultaneously redouble its commitment to renewables by pursuing a global green power target.**

The International Renewable Energy Agency (IRENA) has called for the world to add 1,000 gigawatts of renewable energy capacity annually by 2030.<sup>46</sup> The Commission supports this goal and efforts by IRENA and others to gain global agreement on such a target. Renewables must ultimately replace fossil fuels, and a global goal can help focus attention and galvanize action to accelerate the transition to clean energy.



To supplement a fossil fuel phase-out, efforts to control short-lived climate pollutants should be boosted substantially, to reduce near-term warming and improve public health. Measures to reduce emissions of some hydrofluorocarbons, methane, and black carbon, including the Kigali Amendment to the Montreal Protocol and the Global Methane Challenge, should be strongly supported including through policy frameworks. Methane reduction options that should be promoted include methane fees, feed additives for livestock, upgrading pipelines, and capturing methane from extractive and agricultural activities.

**02** Second, the world should recognize that developing countries will face particular challenges, and the global energy transition should be paired with imperatives of poverty reduction and development. Therefore, to bolster equity, differentiated roles based on countries' development status should be articulated more clearly and forcefully. For the least industrialized countries, transition trajectories might entail, for example, expanded access to affordable and reliable energy to help alleviate poverty, or replacing traditional biomass cookstoves with liquefied petroleum gas.

At the same time, the richest countries, including the oil exporting countries, need to reduce emissions faster to give less developed countries more space to undertake their own transitions. Richer countries should aim not just for net-zero emissions by 2050 but for net-negative emissions, meaning that they remove more CO<sub>2</sub> from the atmosphere than they emit, to compensate for the later net-zero targets of low- and middle-income countries. Such an effort could be initiated by the Organisation for Economic Co-operation and Development or the Group of Seven.



**03 Third, achieving an energy transition that meets the different needs of different countries requires ensuring that key facilitative conditions are met.**

These include greater accountability, sharing of technology and mutual recognition of national climate measures affecting trade.

**Accountability systems should be strengthened to make available reliable and relevant information on the impacts and risks of public and private sector activities.**

Accountability takes several forms: national strategies that transparently set intermediate targets and indicators for different sectors and activities; public evaluation that involves external independent assessment; regular national reporting and comparison in multilateral fora; and national processes that provide relevant and timely information on progress and performance. For the public sector, the International Public Sector Accounting Standards Board is developing a sustainability reporting framework to enhance transparency and accountability. This will enable public sector entities to disclose their climate-related goals, plans and performance consistently and comparably.<sup>47</sup> Accountability from subnational and private actors should also be strengthened, following guidance from the UN Secretary-General's High-level Expert Group on Net-Zero Commitments, which has issued a report with recommendations to ensure credible, accountable and transparent net-zero pledges by non-state actors.<sup>48</sup>

**In addition, international mechanisms should be established to accelerate the deployment of new technologies necessary to the energy transition and ensure worldwide access to them.** Mechanisms to acquire and release patents when the need is demonstrated – making them available for free – could be modelled on practices pioneered by non-commercial patent pools

such as the Eco-Patent Commons, Golden Rice, the Medicines Patent Pool, and the World Intellectual Property Organization's Re:Search facility. This could be supplemented with public and private finance and capacity-building. Additionally, specific financial support mechanisms should be explored for assisting low- and middle-income countries in cases where importing climate technologies adds to an unsustainable current account deficit.

**Furthermore, mutual recognition of national climate policies should be promoted, and attention should be given to the impact of climate-related trade measures in cases where they negatively affect the exports of poorer developing countries.** To reduce potential for trade conflicts that would stand in the way of more ambitious emissions cuts, the World Trade Organization could work to enable mutual recognition of different national climate measures affecting trade. The first step would consist of creating a "comparability forum" to agree on a common metric for climate measures. Once a metric is established and national climate policies can be assessed in comparable terms, this body could be succeeded by a "compatibility forum" in which states recognize one another's policies as mutually compatible. In parallel, specific technical assistance facilities must be made available to developing countries to help them build the necessary capacities to avoid trade-related harm stemming from the climate policies of high-income countries.





# 6. Adaptation

## Key messages

- ✓ To cope with the impacts of climate change, adaptation is necessary at a much larger scale.
- ✓ For adaptation to succeed in the long term requires reducing emissions.
- ✓ New tools and mechanisms should be created, such as country-level partnerships for adaptation and robust metrics for assessing adaptation strategies.
- ✓ Supporting adaptation interventions in agriculture is particularly critical, given its importance in poor countries.
- ✓ Significantly more climate finance is necessary to support adaptation activities, especially in developing countries.





# Background

**Even at today's average global warming level of 1.2°C, vulnerable people and ecosystems around the world are suffering. This distress will only intensify as temperatures continue to rise.**

Enhanced adaptation is an urgent moral and economic imperative to protect billions of vulnerable people from the droughts, famines, floods and other harms caused by a changing climate, as well as to offer them greater economic opportunities. This agenda cannot wait, given the magnitude of impacts being felt right now.

The Global Goal on Adaptation<sup>49</sup> needs to be given teeth, accompanied by a massive scale-up of financing. It should be built around a common framework that focuses laser-like on hyperlocal needs, driven by data and evidence, in the service of broader sustainable development. Indeed, adaptation is integral to meeting the SDGs.

Emissions reductions and adaptation are not equivalent and should not be treated as such. The former addresses the causes of the problem – the growing stock of CO<sub>2</sub> in the atmosphere – while adaptation addresses some of its impacts. If temperatures continue to rise unabated, adaptation will be a losing battle because climate disruption will outpace response actions. Conversely, even when emissions are finally down to zero, adaptation will still be necessary.

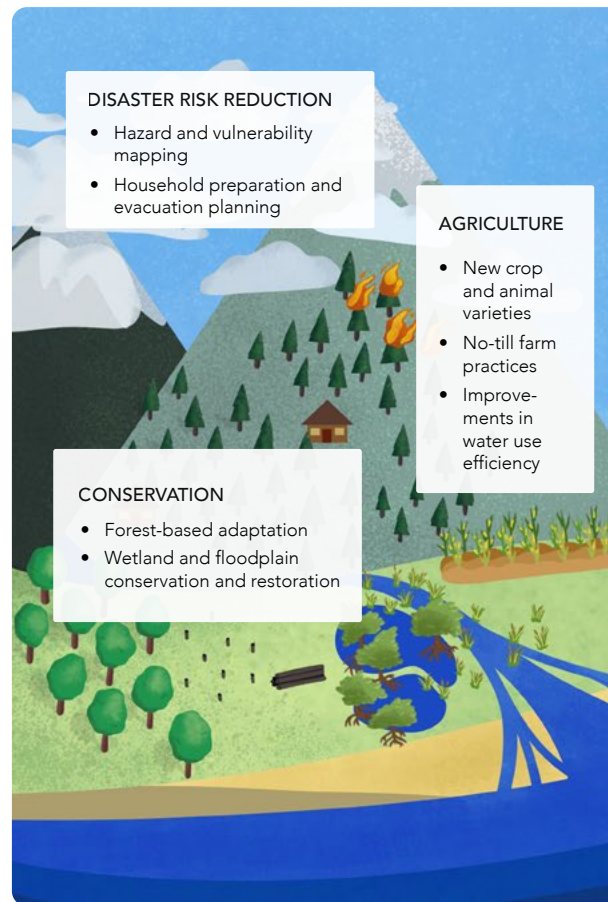
Rising temperatures change risk patterns. While our societies were relatively adapted to a climate close to pre-industrial levels, at warming of 1.2°C we already need to make changes to adapt to different risks; there will be further changes to make if we reach 1.5°C; and still more if warming reaches 2°C.

**Adaptation can take many forms, including (see Figure 5):**

- ✓ structural interventions such as building sea walls or irrigation systems,
- ✓ institutional reforms such as strengthening disaster risk management or social protection systems,
- ✓ behavioural and technological changes such as adopting drought-resistant crops or relocating to safer areas,
- ✓ conserving certain natural ecosystems.

**FIGURE 5**

**Adaptation measures.**



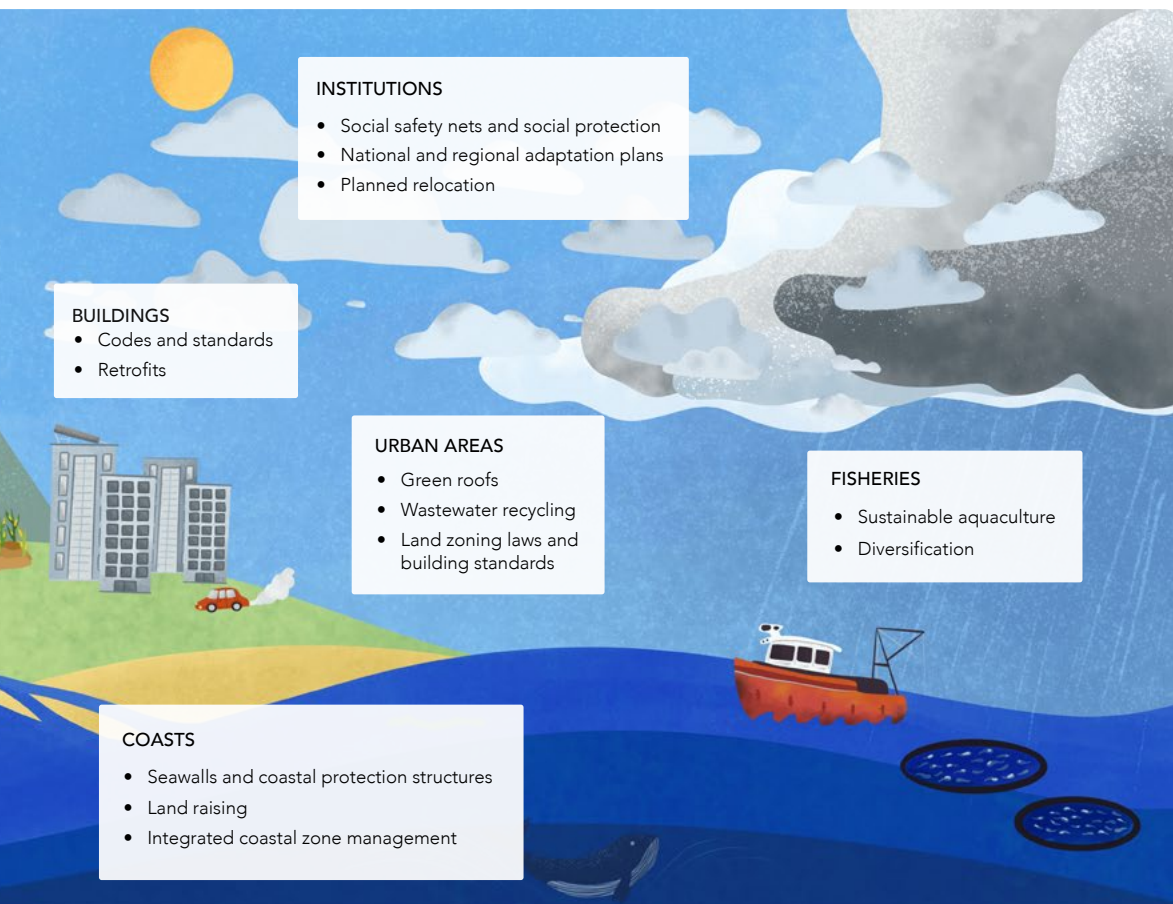
Adaptation efforts to address climate mobility including climate migration and refugees, are of urgent concern to small island developing states and others.

Some adaptation measures are reactive, responding to observed or experienced impacts; others are anticipatory, preparing for projected or potential impacts. Some are incremental, adjusting to moderate changes; others are transformational, altering the fundamental attributes of a system. Some adaptation measures can provide multiple benefits, such as enhancing resilience, reducing poverty, improving health, boosting agriculture, or restoring ecosystems.

All adaptation measures require financial resources on a far greater scale than they are receiving today, especially in developing countries suffering from intensifying economic challenges.

Not only are adaptation efforts a moral duty, but they also carry economic benefits. As estimated by the Global Commission on Adaptation, building climate-resilient infrastructure can generate returns that outweigh costs by a factor of four.

Adaptation also entails trade-offs, however. For example, nature-based measures such as afforestation or wetland restoration can provide carbon sequestration, biodiversity conservation, and water regulation services,



**INSTITUTIONS**

- Social safety nets and social protection
- National and regional adaptation plans
- Planned relocation

**BUILDINGS**

- Codes and standards
- Retrofits

**URBAN AREAS**

- Green roofs
- Wastewater recycling
- Land zoning laws and building standards

**FISHERIES**

- Sustainable aquaculture
- Diversification

**COASTS**

- Seawalls and coastal protection structures
- Land raising
- Integrated coastal zone management

but they may also compete with other land uses such as agriculture or urbanization. These trade-offs should be identified, assessed, and managed through participatory and accountable processes that involve all relevant stakeholders; approaches like climate-smart agriculture may be helpful in managing such trade-offs. The causes and symptoms of climate change can be addressed hand in hand, but considerably more resources are needed if we are to do so.

Adaptation is often treated as a separate issue from development rather than being integrated into broader policies and plans. Key questions addressed by the Climate

Overshoot Commission include how to mainstream adaptation into broader development strategies (without creating a zero-sum game), how this should be paid for (and by whom), and what transformative adaptation actions could be undertaken to limit the risks from climate overshoot, taking account of local needs and conditions.

The Commission does not have answers to the many questions that accompany this work but has settled on recommendations and guiding principles to help high-level policy makers more effectively direct their efforts.

# Technical characteristics

**Adaptation needs vary widely across regions and countries, depending on their exposure and vulnerability to climate hazards, their development status and priorities, and their adaptive capacity and resources. There is no one-size-fits-all solution. Adaptation requires context-specific, participatory, and inclusive approaches that respond to the needs and preferences of different groups and sectors.**

Adaptation to climate change consists of adjusting and building resilience to current and future climate change, for both people and nature. Adaptation will reduce some harm from overshoot, but as warming intensifies, it will become both more important and more difficult to provide; there are physical as well as sociopolitical (for example, financial) limits to adaptation.<sup>51</sup> “Maladaptation” occurs when adaptation measures unintentionally increase risk and vulnerability. For example, using air conditioning to cope with higher temperatures, if it is powered by electricity generated from fossil fuels, would result in more emissions and greater warming.

Adaptation needs and capacity vary widely. Most adaptation involves local actions targeting local benefits. Because many adaptation actions are costly or politically difficult, adaptation is often inadequate. Adaptation shortfalls are universal but are especially consequential for developing countries, which are facing the most severe climate impacts. In regions such as Sub-Saharan Africa, the gap between adaptation needs and available resources is huge and continuing to grow.

Adaptation, and in particular adaptation finance, is frequently considered in the context of the pledge made by developed countries at the 2009 UN climate summit in Copenhagen and formalized at the 2010 climate summit in Cancún, to provide developing countries with 100 billion USD annually in climate finance (for emissions reductions and adaptation) by 2020,<sup>52</sup> a pledge that is both insufficient and was met only recently.<sup>53</sup> (See Section 9.)

Adaptation measures vary widely in terms of sector, location, type of action, timing, and feasibility. Examples include:

- ✓ seawalls and coastal protection structures;
- ✓ new crop and animal varieties;
- ✓ forest-based adaptation;
- ✓ improvements in water use efficiency;
- ✓ wetland and floodplain conservation and restoration;
- ✓ social safety nets and social protection;
- ✓ hazard and vulnerability mapping;
- ✓ household preparation and evacuation planning;
- ✓ land zoning laws and building standards;
- ✓ national and regional adaptation plans;
- ✓ and, at the extreme, planned relocation.

Protection from heat-related human health threats is particularly urgent.

The highly context-specific nature of adaptation has hindered efforts to develop standard metrics for assessing the effectiveness of adaptation options.<sup>54</sup> Metrics are an important tool to monitor outcomes at different levels, evaluate options and identify best



practices, and improve planning and decision making. Without them, it is difficult to know what works and what does not. Efforts to develop adaptation metrics, for example by the International Platform on Adaptation Metrics and the Green Climate Fund, are only at an early stage. This lack of metrics has, in turn, complicated efforts to develop broad strategies and prioritize specific measures.<sup>55</sup> To succeed, such efforts will require much more data on adaptation measures and activities, as well as additional resources. Innovative data collection methods, including remote sensing and the use of digital networks, may help address these needs.

## Governance challenges

**Adaptation poses several governance challenges at different levels and scales. At the global level, it needs more political attention and financial support. The Paris Agreement established a Global Goal on Adaptation, which aims to enhance adaptive capacity, strengthen resilience, and reduce vulnerability. However, this goal is neither legally binding nor quantifiable, unlike the collective emissions goal. Moreover, the adaptation finance gap remains large and persistent. According to UNEP, the annual cost of adaptation in developing countries could range from 140 to 300 billion USD by 2030, and from 280 to 500 billion USD by 2050.**<sup>56</sup>

The lack of adaptation metrics makes it more difficult to mobilize finance for adaptation, but it is not the cause of shortfalls in such finance.<sup>57</sup> Rather, the reason for such shortfalls is the continued unwillingness of developed countries to invest significant

resources in adaptation in developing countries. Adaptation financing requirements are five to ten times greater than current international public adaptation finance flows.<sup>58</sup> These needs relate primarily to agriculture, forestry, ecosystems, water, and energy. The vast bulk of multilateral adaptation finance – roughly 95 percent in 2020-2021 – currently moves through multilateral development banks.<sup>59</sup> The remainder flows through dedicated multilateral climate funds including the Green Climate Fund, Adaptation Fund, Least Developed Countries Fund, and Special Climate Change Fund. Private finance is unlikely to fill the gap in these and other sectors, because returns on adaptation investments with public goods qualities are either small or difficult to capture.<sup>60</sup> (See Section 9.)

At the national level, governments need to bring adaptation into the mainstream of broader development policies and plans, and coordinate adaptation action across different sectors and levels of government.<sup>61</sup> The benefits of mainstreaming include improved development results and enhanced efficiency and scale of adaptation finance flows. Governments also need to strengthen the institutional and legal frameworks that enable effective planning, implementation, monitoring, and evaluation of adaptation actions.

At the local level, the specific needs and preferences of different groups and sectors need to be addressed, taking into account their exposure and vulnerability to climate hazards, their development priorities and aspirations, and their adaptive capacity and resources. It is crucial to respect the rights and interests of everyone involved in adaptation, especially those who are marginalized or disadvantaged. Adaptation also requires fostering social learning and innovation, building on traditional knowledge



and practices, and promoting behavioural change and empowerment.

Specific attention to agriculture and agrifood systems is vital for the livelihoods and food security of millions of people in developing countries, especially in sub-Saharan Africa. These systems are highly vulnerable to the impacts of climate change, such as rising temperatures, droughts, floods, pests and diseases. By 2050, nearly 80 percent of small farms in India, Ethiopia, and Mexico may be experiencing climate impacts.<sup>62</sup> Enhancing the resilience and adaptation of agriculture and agrifood systems to climate change is a key priority for sustainable development and poverty reduction.

Specific attention to climate mobility is also essential. For some vulnerable communities, for example in low-lying island countries, climate change poses a truly existential threat – sea level rise threatens to submerge entire islands. (See Box 1.) Residents may have no choice but to move elsewhere. Adaptation can help forestall such eventu-

alities and help manage them smoothly and humanely if they come to pass.

Shortfalls in adaptation finance, combined with the view that measures that do receive funding are incremental and insufficient, have led to growing calls to embrace “transformative” adaptation, which would address the root causes of vulnerability by shifting entire socioeconomic systems towards long-term sustainability.<sup>64</sup>

The international community needs to tackle several key governance challenges related to adaptation. First and foremost, the yawning gap between global adaptation needs and what is being provided must be narrowed. Second, planning for adaptation must be more coherent and more strategic, taking explicit account of limits to adaptation and seeking to avoid maladaptation. Finally, adaptation must be fully integrated into efforts to promote sustainable development – including meeting the SDGs – as an essential component of clean, inclusive, and equitable transition pathways.

## Box 1: Existential risks to small island states

The most recent assessment report of the IPCC concluded that “In the absence of ambitious human intervention to reduce emissions, climate change impacts are likely to make some small islands uninhabitable in the second part of the 21st century.”<sup>63</sup> This is an existential risk, and these states’ entire populations will be displaced. Such a threat can be addressed only by the extreme response of wholesale migration. For small islands, climate change impacts have now reached dangerous levels. This is a consequence of the developed world not acting in time.

Yet the international community – especially major emitters – has been reluctant even to use the term “climate refugees,” much less begin a dialogue on it. Given that it took three decades for the concept of loss and damage to move from the margins of the UNFCCC to the establishment of a (still empty) fund, these difficult but necessary deliberations are overdue.





# Recommendations

The Commission recommends the following initiatives related to adaptation.

**01 First, because adaptation actions are primarily local in nature, international finance and policy support should be informed by a hyperlocal assessment of climate risks and adaptation priorities.**

This assessment should take advantage of granular data on the exposure and vulnerability of districts and communities to different climate hazards. A Global Climate Vulnerability Index would enable the design and delivery of effective and customized adaptation measures that meet each region's particular needs and preferences. It should also enable the development of new digital tools that can help governments, funders, implementing agencies and others to plan and carry out adaptation actions.

**02 Second, to complement and support these assessments, standard metrics for adaptation should be developed.**

The development and application of a robust system of standard adaptation metrics will enable more strategic investments in climate resilience. The Commission endorses and supports further work to develop metrics for adaptation effectiveness through such efforts as the International Platform on Adaptation Metrics and its Adaptation Metrics Mapping Evaluation framework project.

**03 Third, to integrate these assessments and priorities into comprehensive action plans, the Just Energy Transition Partnership (JET-P) model – a country-led investment platform geared toward emissions reductions – should be replicated and reconfigured to support**

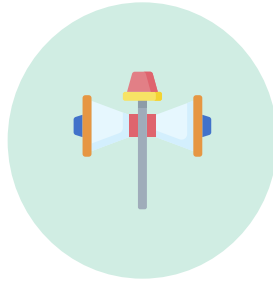
**adaptation.** A JET-P for adaptation would be based on a long-term, national-level strategy informed by national priorities, supported by international funding commitments, and complemented by a framework for disbursing and monitoring the investments. It would shift adaptation from a project to a national orientation, would facilitate the development of robust National Adaptation Plans, and would involve a broader range of interested parties than is typically engaged in adaptation planning and decision-making. This in turn would facilitate alignment with national development and energy transition plans.

**04 Fourth, to strengthen the response capacity of these plans, global efforts to achieve “Early Warnings for All” should be supported.**

Early warning systems protect against extreme weather events, such as floods, droughts, heat waves, and storms. Multi-hazard early warning systems – built on disaster risk knowledge, observations and forecasting, dissemination and communication, and preparedness and response – are critical tools for adapting to climate change and reducing disaster risk. One approach would be to boost support for the UN Early Warnings for All initiative, led by the World Meteorological Organization (WMO), the goal of which is to ensure that every person is protected by early warning systems – including at the local level – by 2027.<sup>65</sup> Early warning systems should be tied to frameworks for emergency response.







**05** Fifth, support should be boosted for efforts to address climate mobility – including migration, displacement, and planned relocation, driven by both slow-onset and extreme weather events. Most climate mobility will be within countries and major urban areas will figure prominently as in-migration hotspots.<sup>66</sup> Municipal and national governments should be empowered to assist and absorb climate migrants, including through insurance mechanisms and social protection measures. International funds need to adjust their operating mechanisms to include municipalities as eligible implementation partners. They also need to provide funding directly to cities by establishing new dedicated mechanisms and/or expanding the thematic focus of existing ones, such as the Global Cities Fund and International Municipal Investment Fund.

**International climate migration, including from small island developing states, warrants particular attention among countries and relevant intergovernmental organizations.** The “Migration with Dignity” framework should serve to organize action on climate migration.<sup>67</sup> In addition, the emerging doctrine of “preventing, minimizing, and addressing” climate migration should be elaborated and strengthened, including with new funding and legal arrangements to support the rights of climate migrants. New funding arrangements for loss and damage could finance these and other initiatives tied to climate mobility.

**06** Sixth, given the importance of agriculture and agrifood systems for adaptation to climate change in poor countries, supporting interventions that enhance their resilience is particularly critical. The Alliance for a Green Revolution in Africa, for example, is an African-led initiative that strengthens smallholder agriculture through improved seeds, soils, markets and policies. More agricultural adaptation is needed across several dimensions. These include:

- ✓ promoting practices that conserve and enrich the soil;
- ✓ developing more diverse crops that can withstand increased drought, heat, pests, and salinity;
- ✓ helping farmers access inputs, finance, information, insurance, and value chains that can increase their income and reduce their vulnerability; and
- ✓ using water resources more efficiently and sustainably.

Research on these and other measures, exemplified by work conducted by the Consortium of International Agricultural Research Centers (CGIAR), is also needed to help poor countries cope with climate change while improving food security and livelihoods.

# Endnotes

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