

ESG Economist

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Adapting to the heat: on climate resilience and adaptation finance

- **Climate adaptation boosts resilience to climate events**
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- **Adaptation finance has grown, but still adaptation needs remain many times greater than flows**
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“it is not the most intellectual of the species that survives; it is not the strongest that survives; but the species that [...] is able best to adapt and adjust to the changing environment in which it finds itself”

On The Origin of Species; Charles Darwin (1859)

Introduction

As the world warms, adapting to climate change has become a necessity. The IPCC defines climate adaptation as the adjustment of natural or human systems in response to actual or expected climate change. As global emissions continue to rise, the need for countries, businesses and households to adapt continues to increase. Adaptation, and adaptation finance needs to progress at the same pace as impacts continue to escalate. Current adaptation efforts are insufficient. Many countries are already experiencing negative impacts from acute or chronic physical risk. This lends urgency to the need for climate adaptation. This note discusses what climate adaptation is and what the challenges financing climate adaptation are.

Adaptation boosts resilience to climate events

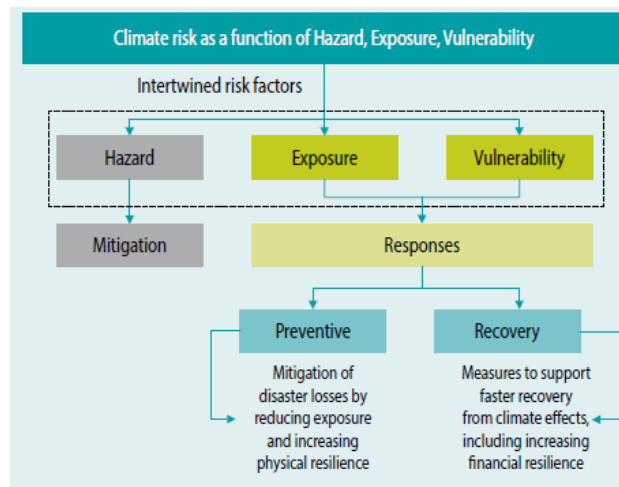
Successful adaptation boosts the resilience and absorption capacity of actors in the case that a climate event occurs. This can be done, for instance, through ensuring the preservation, restoration or improvement of its essential basic structures and functions. Adaptation can be preventive, boosting resilience before an event occurs (for instance increasing flood prevention by fortifying dykes), or it can be reactive after disruption due to an event. Resilience can be physical or financial. Financial resilience could for instance be boosted by tackling widespread insurance protection gaps.

Climate risks arise through 3 interacting risk factors: hazards, exposures, and vulnerabilities. *Hazards* can be mitigated by greenhouse gas (GHG) emission reduction but apart from this collective effort can be considered exogenous. This is doubly the case because the current increase in hazard frequency is caused by past GHG emissions and therefore cannot be immediately reduced by mitigation activities in the present. The presence of people, property or business in a location that suffers from a climate impact generates *exposure*. How much damage arises from the exposure to the impact is determined by *vulnerability*.

While hazards, as mentioned, can be reduced by GHG mitigation, exposure and vulnerability can be addressed by adaptation measures. Climate adaptation encompasses reducing exposure and increasing physical and financial resilience. Examples of measures that increase *physical resilience* could include zoning laws so that there's less exposure in risky locations, or measures that make the built environment stronger. The adaptation needs to take place not just to current climatic conditions but also to worsening climate conditions in the future, which further increases the challenge. Measures to promote physical resilience are the most cost-effective way to adapt, this among others being

because the investment potentially serves to prevent a certain damage multiple times. Investing in adaptation typically shows a high return on investment (see [here](#)).

Drivers of climate risk and role of adaptation



Source: NGFS (2024) conceptual note on climate adaptation

Damages from climate events cannot be avoided completely through preventative measures. This is where *financial resilience* comes in. After an event occurs, financial resilience makes a difference in how recovery takes place. Important in this are elements such as disaster response emergency services and financial support to help with recovery of damages. This financial support can include insurance against natural perils or government compensation schemes. Insurance also has the advantage of encouraging policy holders to take preventative measures: when exposure and vulnerability to natural perils is high, insurance premiums are going to be higher as well. In that way, the cost of climate-related insurance can serve as a signalling mechanism for implementing preventative adaptation measures.

Financial resilience cannot exist without physical resilience. Increased physical resilience is needed to keep insurance of climate risks affordable. In addition to building physical and financial resilience to more frequent extreme weather events, it's also essential to adapt to the chronic physical risk posed by climate change. Adaptation to impacts on labour and agricultural productivity are examples, but also adaptation to increased heat stress in urban areas and to decreased availability and quality of the water supply.

When mitigation is insufficient, adaptation becomes more important

Climate change brings about costs. Firstly, obviously, there is the cost of reducing GHG emissions to slow down climate change. Secondly, there is the cost of adaptation. Lastly, there is the cost of loss and damage as a result of climate impacts that have occurred or are inevitable despite adaptation efforts.

When there aren't enough incentives to reduce emissions, adapting to climate change becomes more important. This is where carbon pricing comes in. When financial incentives to mitigate are weak due to low carbon pricing, adaptation finance needs to increase further as we move towards a warmer world. As adaptation is for the risks that are not expected to be mitigated, it makes sense to expect that a low carbon price switches climate finance from emissions reduction towards adaptation. The advantage of adaptation is also that a certain person, region or country is not dependent on global action.

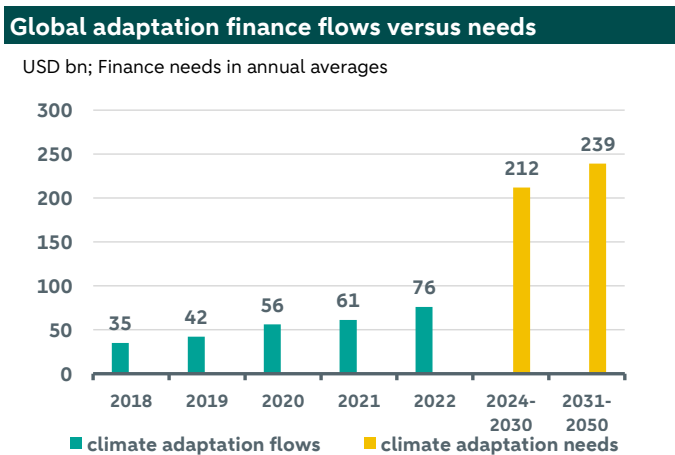
Investment to boost resilience (for instance on flood defences, such as [here](#)) can boost the economy if these do not replace other investments (i.e. no (full) crowding out). By increasing resilience to climate events, the damage they cause can be reduced. In climate scenarios, damage functions are different when there is an assumption of climate adaptation included. A certain amount of climate change is associated with a less steep increase of damages when there is more resilience, for example leading to a convex damage function becoming more linear.

Adaptation finance has grown, but still adaptation needs remain much greater than flows

Lately, there has been increased attention for climate adaptation. There was, of course, the instalment of the Fund for Responding to Loss and Damage established at COP27 in 2022. This fund is expected to respond to the fallout associated with acute or chronic climate events for the most vulnerable communities. It is expected to become fully functional in 2025, although some important issues remain to be addressed. Every country has to submit a National Adaptation Plan (NAP) in 2025. During COP29 the “high level dialogue on National Adaptation Plans” led to a support programme established for the adaptation plans of developing economies, while there was also discussion on innovation and technical support. Discussions on adaptation will be continued in COP30.

Over the past few years, global climate finance has seen substantial growth, but still remains insufficient to meet global climate mitigation and adaptation needs. Climate finance flows more than doubled between 2018 and 2022 (from \$674bn to \$1.46trn, [\(Climate Policy Initiative, 2024\)](#)). However, estimates suggest that \$7.4trn annually will be required by 2030 to meet global climate mitigation and adaptation needs. Thus, the gap between current finance flows and the estimated global climate finance needs remains considerable (NGFS, 2024).

Within total climate finance, finance for adaptation has been lagging finance for mitigation. Mitigation finance reached \$1.3trn in 2022. Adaptation finance more than doubled between 2018 and 2022, reaching \$76bn in 2022. Despite this impressive growth rate and given the low base it grew from, needs for adaptation finance remain many times greater than current flows. Less than 10% of current climate finance is aimed at adaptation (for developing economies this share is a bit higher). This number of \$76bn contrasts with estimated adaptation needs for emerging markets and developing economies (EMDEs) of more than \$200bn annually in the coming years. And this number may still be an underestimation given uncertainty regarding future damages and the cost of inaction.



Source: Climate Policy Initiative (2024)

Adaptation finance almost exclusively comes from the public sector. Whereas more than half (54%) of climate mitigation finance came from the private sector in 2022, the private sector only provided 8% of adaptation finance. The Global Centre on Adaptation found that domestic budgets are the largest source of funds for adaptation in many developing countries despite the wider attention given to international flows [\(GCA, 2019\)](#). Most of the international flows (84%) take the shape of debt, about half of which is on concessional terms. This debt-dominated structure is, despite the partially concessional terms, a potential issue for EMDEs that already have high debt.

For advanced economies, climate adaptation finance challenges remain, particularly in coastal, rural, and agricultural regions where the frequency and severity of climate-related natural disasters continue to rise. Because climate change disproportionately affects the poorer population segments (for instance because they don't have the resources to react to climate risk), increased adverse climate events can further exacerbate inequalities within countries.

Financing improvements in physical and financial resilience has specific challenges

Data on climate finance has so far mostly been available for mitigation finance, with information on adaptation finance lagging behind. The context-specific nature of climate adaptation projects makes it more difficult to standardise them in for instance a taxonomy, complicating efforts to identify and report on adaptation finance. Challenges include data gaps, fragmented disclosure standards, knowledge gaps (such as technical skills in SMEs). In emerging markets, efficient capital markets, credit guarantee systems and other needed foundations to scale adaptation finance may be less available. An additional complication is that the benefits of adaptation projects are often enjoyed collectively, for the common good. This makes it difficult to translate these into cash flows for the investor. While investing in adaptation typically yields substantial economic benefit, the short-term returns can be low, so that patient finance is needed. These challenges make private sector finance particularly challenging, leaving the public sector as the primary source of adaptation finance.

To improve financial resilience, the currently widespread insurance protection gap needs to close. According to Swiss Re, insured losses from natural hazards have been growing at around 6% annually over the past 3 decades and reached \$108bn in 2023 (please note that this is all natural hazards, so it also includes hazards not related to climate change). Total economic losses in 2023 reached \$280bn. This implies that 61% of the losses were uninsured: a significant insurance protection gap. Closing this gap may necessitate public-sector support through reinsurance schemes.

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