H HEURISTICS

Navigating a Changing World

Convergence as Polycrisis Resilience

How Narrowing Development Gaps Can Reduce Humanity's Exposure to Interconnected Systemic Threats

Economic • Technological • Environmental • Human Development

A concept developed by Hunter Hughes

Founder of H Heuristics

Research Report · November 2026

OVERVIEW

Summary at a Glance

The whole report in one page

Humanity faces a tangle of threats at once: a warming climate, polluted air and water, fragile food supplies, new diseases, financial shocks and conflict. Experts call this a **polycrisis**.[1] This report argues that its danger comes not only from the threats themselves but also from the **unequal ability to respond**. The same flood or price spike can be a manageable setback in one country and a catastrophe in another.

> *The global polycrisis is intensified not only by the existence of interconnected threats, but also by disparities in humanity's capacity to respond to them. Economic, technological, environmental, and human development convergence can reduce these disparities by expanding the resources, capabilities, and technologies available to populations and countries facing systemic risks.*
>
> — Core proposition, H Heuristics

Key findings

1. **The capability gap is enormous.** About 4.6 billion people lack essential health services, 3.4 billion lack safe sanitation, and around 2 billion each lack clean cooking, safe drinking water and internet use.[4, 5, 6, 7]
2. **Gaps turn hazards into disasters.** Lower-income countries have under half of disaster events but about two-thirds of the deaths. A magnitude 7.0 earthquake killed roughly 200,000 people in Haiti in 2010; one releasing 500 times more energy killed about 500 in Chile.[9, 13]
3. **Capability can be built, and it works.** Bangladesh cut cyclone deaths from at least 300,000 (1970) to about 30 (2020) with warnings, shelters and trained volunteers, without first becoming rich.[14]
4. **Convergence is real but slow and uneven.** Poorer countries now tend to grow faster than richer ones, but at a pace that would take generations to close the gap. About two-thirds of the world's extreme poor live in Sub-Saharan Africa.[2, 12]
5. **Five pathways link catching up to safety:** energy, health, digital access, water and infrastructure, and fiscal and institutional strength.
6. **The Convergence Resilience Dividend** is the proposed measure of safety gained by narrowing gaps. An illustrative scenario suggests accelerated convergence could lower vulnerability by roughly 25% by 2050 and 36% by 2100, with wide uncertainty. It is a stylized exercise, not a forecast.

BOTTOM LINE

Accelerating **sustainable** convergence is more than an economic goal. It is a long-term strategy for reducing global vulnerability, strengthening adaptive capacity and improving human survivability, working alongside efforts to reduce the threats themselves.

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SECTION 1

Introduction: Same Storm, Different Outcomes

Why the ability to respond matters as much as the threat itself

Picture two towns hit by the same storm on the same night. Both receive the same amount of rain, and both rivers rise to the same height. In the first town, forecasts reached every phone hours earlier, a sturdy shelter stood on high ground, the power stayed on at the clinic, and the government had funds set aside for repairs. By the next week, the roads are open and life resumes. In the second town, there was no forecast, houses stood on a floodplain, the clinic lost power, and the family savings that disappeared with the water will take years to rebuild. The storm was identical. The *ability to respond* was not.

This simple thought experiment captures the central idea of this report. Much public discussion of global risk focuses on the threats: how fast the climate is warming, how likely the next pandemic is, how fragile supply chains have become. These questions matter enormously. But a threat only becomes a disaster when it meets weakness. Risk is shaped by what hits us *and* by how well prepared, protected and resourced we are when it arrives.

The question this report asks

Humanity today does not have one capacity to respond to danger. It has a very uneven patchwork of capacities. Some societies have dependable electricity, strong health systems, fast internet, safe water, and governments able to borrow and rebuild. Others have little of this. Billions of people live in the gap between those two worlds. Our question is simple to state and hard to answer: **if the world narrowed that gap, would humanity as a whole become safer?**

The process of narrowing development gaps is often called **convergence**. In economics, convergence means that poorer economies grow faster than richer ones and so gradually catch up. In this report we use the word more broadly. We include catching up in income, but also in technology, environmental quality and human development, such as health and education. We argue that these forms of convergence work together as a mechanism of **polycrisis resilience**: they reduce the exposure and vulnerability of people to a tangle of connected threats and raise their ability to cope and recover.

Why this matters now

Three developments make this question urgent. First, risks are increasingly connected. A drought can push up food prices, which strains national budgets, which raises the risk of unrest, which disrupts trade. Second, shocks are arriving faster than many countries can recover from them, leaving little time to rebuild between crises. Third, progress on basic development has slowed. At current rates, the World Bank projects that hundreds of millions of people will still live in extreme poverty in 2030.[2] The world is not on track to close its gaps by default.

Seen this way, development finance, clean energy, health systems and digital inclusion are not only about prosperity or fairness. They are also risk management for the whole planet. A world in which every region can detect, absorb and recover from shocks is a world with fewer catastrophes and fewer ways for local

crises to spread globally.

What this report does

This report is a conceptual and evidence-based analysis developed by Hunter Hughes, Founder of H Heuristics. It sets out a framework, gathers current data from international organizations and research, examines real-world cases, proposes a new measurement concept called the **Convergence Resilience Dividend**, and runs a simple illustrative scenario to show how the idea might be tested. It is written in plain language for general readers, students and decision-makers. Where we use technical terms, we explain them, and a glossary appears at the end.

Table 1. A reader's guide to this report

Section	The question it answers
2. The Polycrisis and the Capacity Gap	What is a polycrisis, and why do unequal capabilities make it worse?
3. The Core Concept	What do we mean by convergence, and how could it create resilience?
4. The Capability Gap in Numbers	How large are today's gaps in energy, health, water, digital access and finance?
5. Lessons from Real Events	What do real disasters tell us about the value of capability?
6. Is Convergence Happening?	Are poorer countries actually catching up, and how fast?
7. Five Pathways	Through which channels does catching up make people safer?
8. The Development–Resilience Loop	How do development and resilience reinforce each other?
9. The Convergence Resilience Dividend	How could the safety gains from convergence be measured?
10. A Scenario Exercise	What might the dividend look like in a simple model?
11. Limits, Risks and Caveats	What could go wrong with this idea?
12. Action Agenda and Conclusion	What should governments, funders, firms and researchers do?

A note on evidence and honesty

Good analysis separates what we can measure from what we can only estimate. Throughout, we label data from published sources with numbered references, and we mark anything that comes from our own illustrative modelling. The scenario in Section 10 is a thought tool, not a prediction. Statistics from different organizations use different years and definitions, so figures should be read as approximate and compared with care.

SECTION 2

The Polycrisis and the Capacity Gap

How connected threats meet unequal defenses

What is a polycrisis?

The word **polycrisis** was popularized by the historian Adam Tooze to describe moments when many crises seem to feed each other. In 2024, researchers at the Cascade Institute and collaborators gave it a precise definition: a global polycrisis is the *causal entanglement of crises in multiple global systems* in ways that significantly degrade humanity's prospects.[1] In plain terms, it is not just several bad things happening at once. It is several bad things that make each other worse, so fixing one problem may not be enough if the others keep pushing it back.

How threats connect

Threats connect through shared systems that everyone depends on, such as food, energy, finance, health and information. When one system is shocked, the effects travel through the links between them:

- **Climate to food to unrest.** Heat or drought cuts harvests and raises food prices. Households that spend most of their income on food are pushed into hardship, which can fuel instability and displacement.
- **Disease to debt.** A pandemic strains hospitals and closes workplaces. Governments borrow to cope, and later debt payments leave less for health, schools and climate protection.
- **War to energy to inflation.** Conflict disrupts fuel and grain exports. Importing countries face higher energy and food costs at the same moment.
- **Pollution to health to productivity.** Dirty air and water cause illness. Sick workers and children lose days of work and school, slowing the growth that would pay for cleaner systems.

These chains are not equally dangerous everywhere. Where people have savings, insurance and strong public services, a break in one link can be absorbed. Where they do not, it can spread.

Hazard, exposure, vulnerability and capacity

To see why, it helps to borrow a framework used by climate scientists, including the Intergovernmental Panel on Climate Change (IPCC).[20] Risk depends on four things (Figure 1).

- **Hazard** is the threat itself: a flood, a heat wave, a virus, or a price shock.
- **Exposure** is who and what is in the path of the hazard: people, homes, farms, factories and roads.
- **Vulnerability** is how badly the exposed people and assets are harmed. It depends on building quality, health, income, savings and access to services.
- **Adaptive capacity** is the ability to prepare, respond and recover. It depends on money, knowledge, technology, institutions and social networks.

Global efforts to cut greenhouse gases, protect nature and keep the peace mainly act on *hazards*. Convergence acts most directly on *vulnerability* and *adaptive capacity*. This is why the two approaches are partners rather than rivals: reducing hazards lowers the size of the storm, and building capacity lowers the

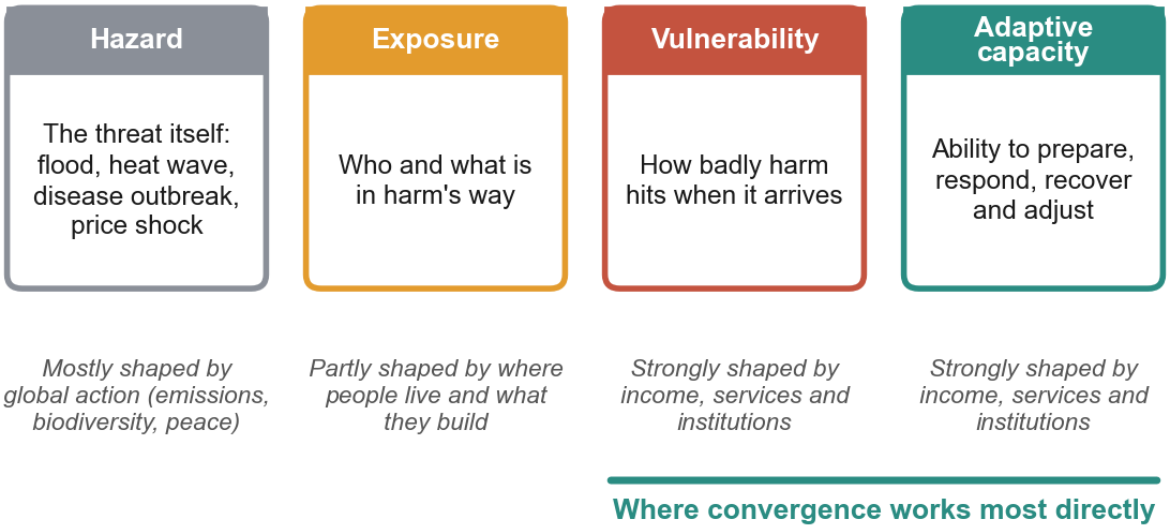


Figure 1. The four ingredients of risk
Source: Author's illustration, adapted from the IPCC risk framework.[20]

damage any storm can do.

Why the capacity gap matters more in a polycrisis

Capacity gaps would matter even if crises arrived one at a time. In a polycrisis they become far more dangerous, for three reasons.

1. Capacity gets stretched thin

When several shocks hit together, every country needs money, supplies and skilled people at once. Wealthy governments can usually borrow cheaply and import what they lack. Lower-income governments often face higher borrowing costs and thinner reserves.

2. Recovery time disappears

Resilient societies rebuild quickly, often to a higher standard. Where recovery takes years, the next hazard arrives before the last one is repaired, and losses compound. For a poor household, one bad event can erase the savings, livestock, tools or schooling that took a decade to build.

3. Weak links affect everyone

Global systems are only as strong as their weakest parts. An outbreak missed early in one region can travel by air to every other. A flooded factory in one country can halt production lines in another. Famine and displacement can strain politics far from the original crisis. No region is fully safe while others remain deeply exposed.

> **KEY IDEA**
> A polycrisis is dangerous because threats are connected. It is **deadlier** because the capacity to respond is unevenly spread. Closing capability gaps cuts the damage from the whole tangle at once. Wealthy countries often lose more dollars; lower-income countries lose more lives and a larger share of income.

SECTION 3

The Core Concept: Convergence as Resilience

What convergence means and how it could make people safer

What do we mean by convergence?

In its simplest form, **convergence** means that groups that start far apart move closer together. Economists first used the word for income: if poorer countries grow faster than richer ones, their incomes converge over time. In this report we apply the idea to four connected kinds of catching up (Table 2).

Table 2. Four kinds of convergence

Type	What narrows	Examples of what changes
Economic	Gaps in income, productivity, jobs and public revenue	Higher incomes; more productive farms and firms; larger tax bases that fund services
Technological	Gaps in access to tools and know-how	Mobile phones and internet; solar power and batteries; modern medicine; weather forecasting; digital payments
Environmental	Gaps in clean, safe living conditions	Clean cooking fuels; cleaner air and water; renewable energy; healthy ecosystems that buffer floods and heat
Human development	Gaps in health, education and basic wellbeing	Lower child mortality; more years of schooling; better nutrition; access to health care and social protection

Convergence does **not** mean that every country becomes identical, that cultures or economies become uniform, or that anyone must be made poorer. It means that the *floor* rises, so that wherever people live, they can count on a basic set of capabilities that keep them safe. Think of it as lifting the bottom of the range rather than flattening the top.

The core proposition

The central idea of this report can be stated in three sentences, as developed by H Heuristics:

> *The global polycrisis is intensified not only by the existence of interconnected threats, but also by disparities in humanity's capacity to respond to them. Economic, technological, environmental, and human development convergence can reduce these disparities by expanding the resources, capabilities, and technologies available to populations and countries facing systemic risks. Consequently, accelerating sustainable convergence should be understood as more than an economic development objective. It is a potentially significant long-term strategy for reducing global vulnerability, strengthening adaptive capacity, and improving human survivability.*
>
> — H Heuristics

The proposition makes a careful claim. It does not say convergence is the *only* strategy, or that it removes threats. It says that narrowing capability gaps is a *potentially significant* way to lower vulnerability and raise the ability to cope. It also says the convergence must be *sustainable*, a point we return to below.

How convergence turns into resilience

The most important theoretical question is *how* catching up becomes safety. Figure 2 shows the proposed chain. Development convergence expands what a country can do: its tax revenue, productive capacity, institutions and access to technology. Those capabilities allow more investment in resilience, such as adaptation, clean energy, health care, water security and disaster preparedness. Over time this lowers systemic vulnerability, which means less exposure, less sensitivity to harm and more capacity to recover. The end result is improved human survivability, meaning fewer preventable deaths and stronger long-term outcomes.

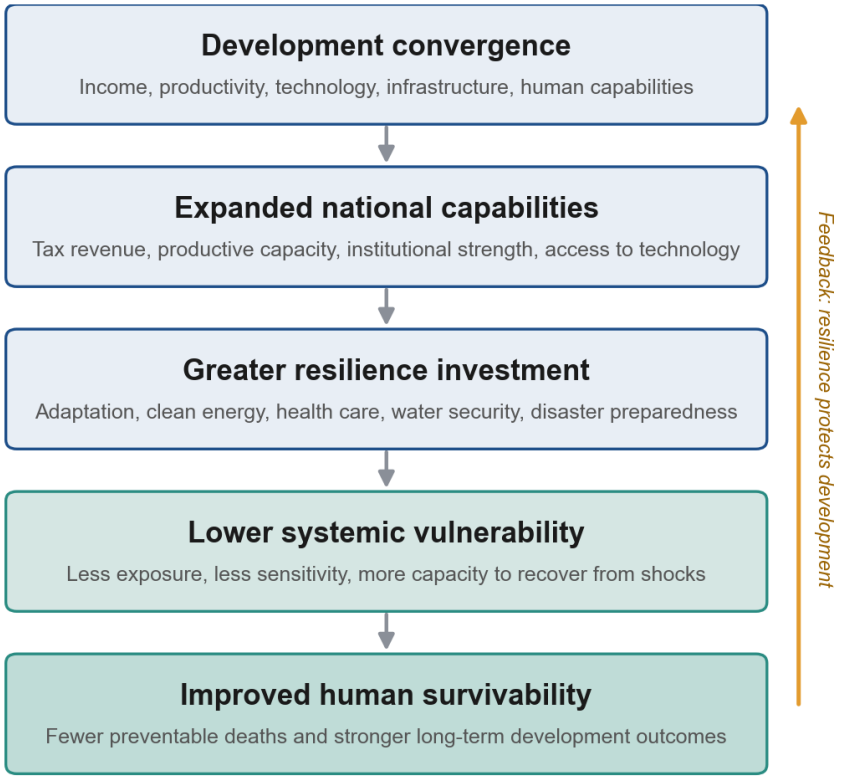


Figure 2. From convergence to resilience
Source: H Heuristics framework.

The arrow on the right of Figure 2 marks a feedback loop. Resilience protects development from disruption, and development provides more resources for resilience. We examine this loop in Section 8.

Two routes to the same destination

There are two ways convergence can build resilience, and they work at different speeds.

The broad route: raising incomes and productivity

Economy-wide growth creates jobs, savings and tax revenue. Over decades, this lets families build safer homes, lets governments build better services, and lets companies invest in technology. This route is powerful but slow. Large income gaps can take generations to close.

The targeted route: closing survivability-critical gaps first

Some capabilities have a very large effect on safety relative to their cost: early-warning systems, clean cooking, safe water, vaccination, building standards, basic primary care and reliable backup power for clinics. Countries can prioritize these before incomes have fully caught up. Bangladesh, discussed in Section 5, is the best-known example: it sharply reduced cyclone deaths while still a low-income country.

The implication is hopeful. The world does not have to wait for full economic convergence before it sees resilience benefits. A strategy that pairs long-run growth with targeted early investments in life-saving capabilities can deliver safety sooner.

Why "sustainable" matters

If catching up were achieved by copying the most polluting paths of the past, it could worsen the very hazards it is meant to protect against, such as heat waves and floods. We therefore use the phrase **sustainable convergence** to mean catching up that passes three tests:

1. **Low-carbon and low-pollution.** Energy, transport, farming and industry expand using cleaner technologies wherever possible, using the fact that clean options, such as solar power, have become much cheaper.
2. **Nature-positive.** Growth does not erode the forests, wetlands, soils and water sources that protect communities from shocks.
3. **Inclusive and durable.** Gains reach poorer and rural people and are maintained over time, rather than creating isolated pockets of progress that fade when funding ends.

> **WHAT THIS REPORT DOES AND DOES NOT CLAIM**
>
> **It claims** that capability gaps raise global vulnerability, that closing them is likely to reduce it, and that this effect deserves a place in risk strategy. **It does not claim** that convergence is automatic, that income alone guarantees safety, or that convergence can replace efforts to cut emissions, prevent conflict and protect nature. Those limits are explored in Section 11.

SECTION 4

The Capability Gap in Numbers

A snapshot of who lacks what, using the latest international data

Before asking whether convergence could reduce risk, we need to see how large the gaps are. This section reviews the most recent data from international monitoring bodies. Years differ slightly across sources, and numbers are rounded, so the figures are best read as the right order of magnitude rather than exact counts.

Gaps in basic services

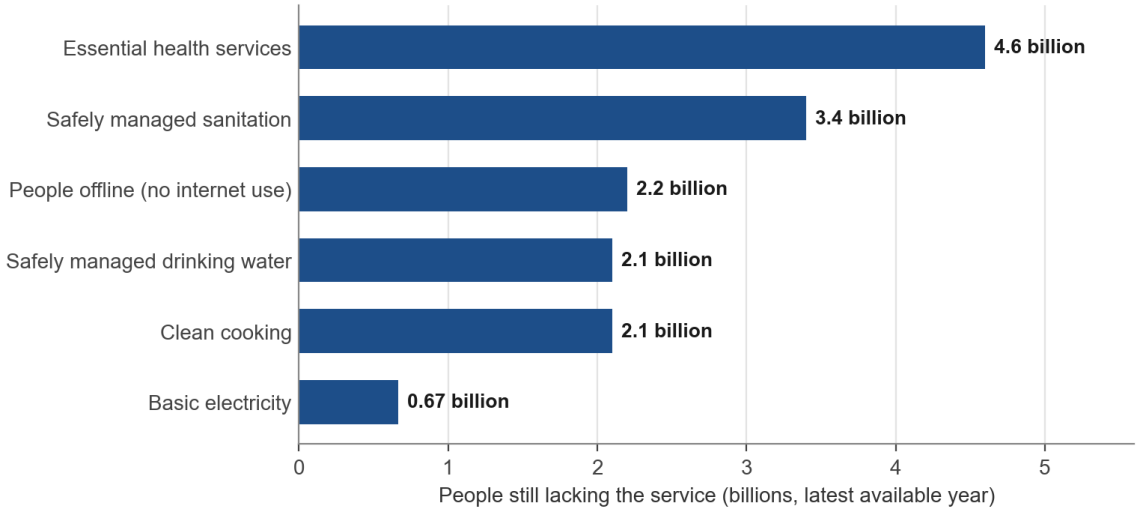


Figure 3. Billions of people still lack basic capabilities

Sources: WHO and World Bank (2025)[6]; WHO/UNICEF JMP (2025)[5]; ITU (2025)[7]; Tracking SDG7 (2025)[4]. Years vary (2023 to 2025).

Figure 3 shows that gaps are measured in *billions* of people, not millions. Some of the numbers deserve a closer look.

- **Electricity.** About 92% of the world's people now have basic electricity access, but roughly 666 million still do not. About 85% of them live in Sub-Saharan Africa.[4]
- **Clean cooking.** Around 2.1 billion people cook with polluting fuels such as wood, charcoal or animal dung, with little change from the year before.[4] The smoke is a leading household health hazard, and it also means hours of daily fuel collection, often by women and children.
- **Water and sanitation.** One in four people, about 2.1 billion, lacks safely managed drinking water, and 3.4 billion lack safely managed sanitation. Some 354 million still practice open defecation.[5]
- **Health care.** An estimated 4.6 billion people lacked access to the full range of essential health services in 2023, and about 2.1 billion faced financial hardship from health costs.[6] Coverage has improved since 2000 but has slowed in recent years.
- **Internet.** About 2.2 billion people remain offline, nearly all in developing economies. Internet use is near-universal in high-income countries (94%) but only 23% in low-income countries.[7]

Figures describe where we stand today. Table 3 adds the direction of travel: most gaps are narrowing, but slowly, and several are on course to persist through 2030.

Table 3. Where the gaps stand and where current trends point

Capability	Gap today	Recent direction or outlook	Source
Electricity	666 million lack access	About 645 million still without access in 2030 if trends continue	[4]
Clean cooking	About 2.1 billion	Roughly 1.8 billion still without access in 2030 if trends continue	[4]
Drinking water	2.1 billion lack safely managed water	Coverage rose from 68% to 74% since 2015; 961 million gained access	[5]
Health care	4.6 billion lack essential services	Coverage index rose from 54 to 71 (2000 to 2023) but progress has slowed	[6]
Internet	2.2 billion offline	Down from 2.3 billion a year earlier	[7]
Extreme poverty	Hundreds of millions in extreme poverty	Under the older $2.15 line, about 622 million (7.3%) expected in 2030	[2]

Gaps in money and income

Income gaps shape what households and governments can afford to do. In 2025 the World Bank raised its international extreme poverty line from $2.15 to $3.00 a day to reflect updated prices, which added roughly 125 million people to its count without any real worsening of incomes.[3] Under the older line, the Bank's 2024 report projected that around 622 million people, or 7.3% of the world, would still be in extreme poverty in 2030. That is more than double the 3% target.[2] At a more generous line of $6.85 a day, the report warned that ending poverty for nearly half of humanity could take over a century at the current pace.[2]

Public money tells a similar story. International public funding for climate adaptation in developing countries was about $26 billion in 2023. The United Nations Environment Programme (UNEP) estimates the yearly *gap* between what is needed and what is flowing at $284 to $339 billion, which is 12 to 14 times current flows.[8] Figure 4 compares these two gaps.

Where the gaps meet the hazards

Capability gaps matter most where hazards are strong. A World Bank study of flood risk found that about 1.8 billion people, or 23% of the world, are directly exposed to a serious flood in a 1-in-100-year event. Nearly 90% of them live in low- and middle-income countries, and about four in ten of those exposed live in poverty.[11] In other words, the people most exposed to the hazard are often the ones with the fewest resources to prepare for it.

Disaster deaths reflect the same pattern. A long-running analysis of global disaster records for 1994 to 2013 found that higher-income countries experienced 56% of disasters but 32% of the deaths. Lower-income countries experienced 44% of disasters but 68% of the deaths, and the average disaster killed more than three times as many people in a low-income country (332) as in a high-income one (105).[9] Figure 5 shows

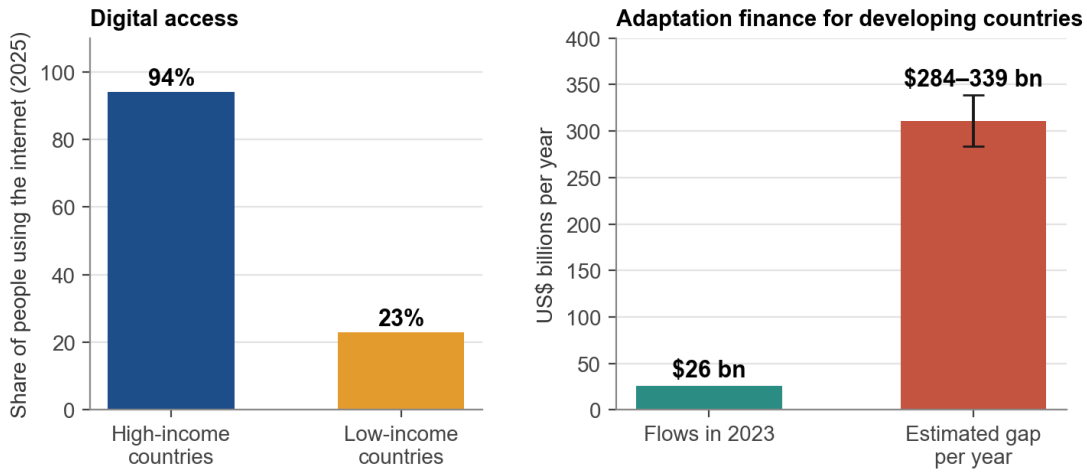


Figure 4. Digital access and adaptation finance

Sources: ITU (2025)[7]; UNEP Adaptation Gap Report 2025[8]. Gap bar shows the midpoint of the $284–339 billion range.

this contrast.

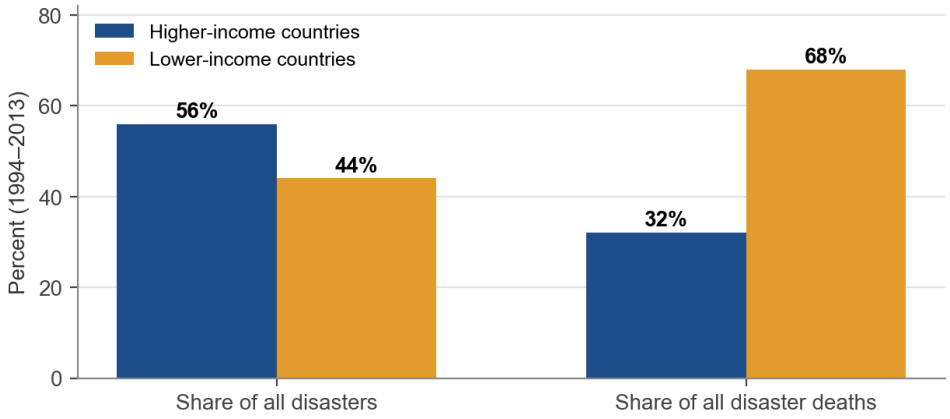


Figure 5. Disasters and disaster deaths by country income

Source: CRED and UNDRR, The Human Cost of Natural Disasters (2015)[9]. Data cover 1994 to 2013; the more recent annual pattern is broadly similar but is not reported in the same grouping.

Gaps stack on top of each other

The most important thing about these figures is that they are not independent. The same households often lack electricity, clean fuels, safe water, health care and internet access at the same time. A clinic without power cannot keep vaccines cold. A village without a phone signal cannot receive a storm warning. A family without clean water is more likely to fall ill when a flood strikes. Each missing capability weakens the others, which is why the gaps are better thought of as a web than a list.

> **KEY IDEA**
>
> Capability gaps do not add up; they **multiply**. Closing one gap helps. Closing several together, so that clinics have power, power supports connectivity, and connectivity carries warnings and payments, can change what a community can survive.

SECTION 5

Lessons from Real Events

What disasters teach us about the value of capability

Statistics describe averages. Real events show what capability gaps look like on the ground. Four cases and two broad trends show that the link between capability and survival is practical, not merely theoretical. None is a controlled experiment, and we note other factors involved.

Haiti and Chile, 2010

In January 2010 a magnitude 7.0 earthquake struck near Port-au-Prince, Haiti. Estimates of deaths commonly centre on about 200,000, though some counts are lower and others higher.[13] Six weeks later a magnitude 8.8 earthquake struck Chile. Because the moment-magnitude scale is logarithmic, the Chilean quake released roughly 500 times more energy, yet it caused about 500 deaths, roughly half of them from the tsunami that followed.[13]

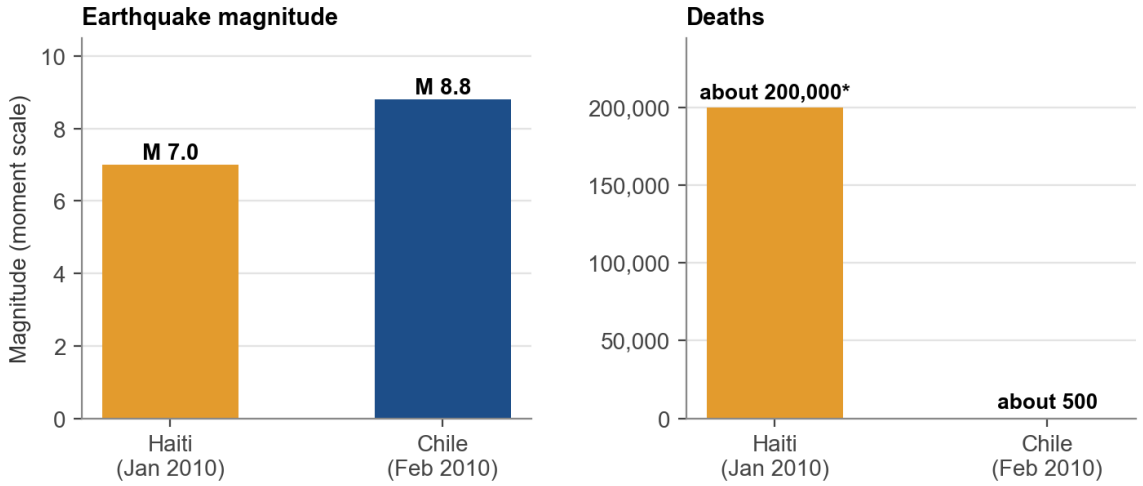


Figure 6. Two earthquakes in 2010

*Sources: FIU Extreme Events Institute[13]; USGS-based figures cited in ScienceDaily[13]. *Haiti estimates vary widely, from about 100,000 to over 300,000.*

Why the difference? Experts point to several factors. Haiti's quake was shallow and close to a dense capital city. Chile's was offshore. But the single most-cited explanation is the built environment: Chile has had seismic building rules for decades and updates them after each quake, and it has the money and institutions to enforce them, while Haiti had no effectively enforced building code.[13] Wealth, preparedness and governance worked together. A quake that is far stronger killed a tiny fraction as many people where buildings were built to survive it.

Bangladesh and its cyclones

In November 1970 the Bhola cyclone struck what was then East Pakistan and is now Bangladesh, killing at least 300,000 people and possibly many more.[14] Bangladesh was still classed as a low-income country when Sidr struck in 2007, and it remains one of the most cyclone-exposed places on Earth. Yet when Cyclone Sidr hit in 2007, deaths were roughly 3,400 to 4,200, and when Cyclone Amphan struck in 2020, they were about 30 in Bangladesh (Figure 7).[14]

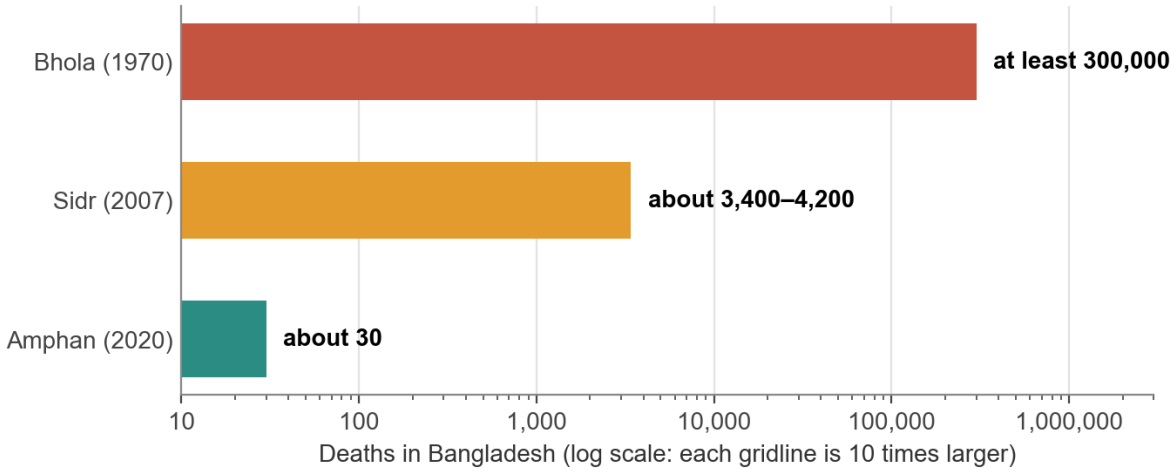


Figure 7. Cyclone deaths in Bangladesh over 50 years

Source: The Conversation (2020); The Business Standard (2021)[14]. Estimates vary by source; storm strength and landfall conditions also differed between events.

What changed? Observers credit four things working together: improved forecasting and warning systems, a large network of trained community volunteers who spread warnings door to door, a big increase in cyclone shelters (from a few hundred or fewer to well over 10,000, according to different counts), and stronger national institutions that organize evacuations.[14] None of this required Bangladesh to become wealthy first. It shows the **targeted route** from Section 3 in action. Lives saved are not the same as livelihoods saved, however: crops, homes and incomes are still badly hit, and shelter quality and access still have gaps.[14]

Early warning for all

The World Meteorological Organization (WMO) reports that disaster-related mortality is nearly six times lower in countries with comprehensive multi-hazard early warning systems than in countries with limited ones.[15] About 60% of countries now report having such a system, but coverage is lowest in small island developing states (43%) and the Americas and Caribbean (51%), against 72% in Asia-Pacific.[15] The United Nations aims for early warning coverage for everyone by 2027. A warning must be received, understood and acted upon, so it depends on phones, power, forecasting skills and trusted local institutions, a clear example of capabilities combining.

When the shock outlasts the response: Pakistan, 2022

Not every case is about early deaths. In 2022, record monsoon floods swept across Pakistan, killing more than 1,730 people and affecting about 33 million.[23] A joint assessment by the government, the World Bank, the United Nations and others put physical damage at about $14.9 billion and economic losses at about $15.2 billion, more than $30 billion in total, and estimated that national poverty could rise by 3.7 to 4.0 percentage points, pushing roughly 8.4 to 9.1 million more people below the poverty line.[23]

The lesson is about *recovery*. Even without the worst loss of life, years of development can be erased when savings, insurance and public budgets are thin. Capability protects people during a disaster and the progress they have made once it passes.

Two broad signs of progress

The wider data also show that capability can raise safety. The United Nations' 2025 Global Assessment Report found that disaster deaths and missing persons per 100,000 people fell by about half, from 1.61 in 2005–2014 to 0.79 in 2014–2023.[16] Child survival tells a similar story: deaths among children under five fell from 93 per 1,000 live births in 1990 to 37 in 2023.[19] Even so, children in Sub-Saharan Africa remain several times more likely to die before age five than children elsewhere.[19]

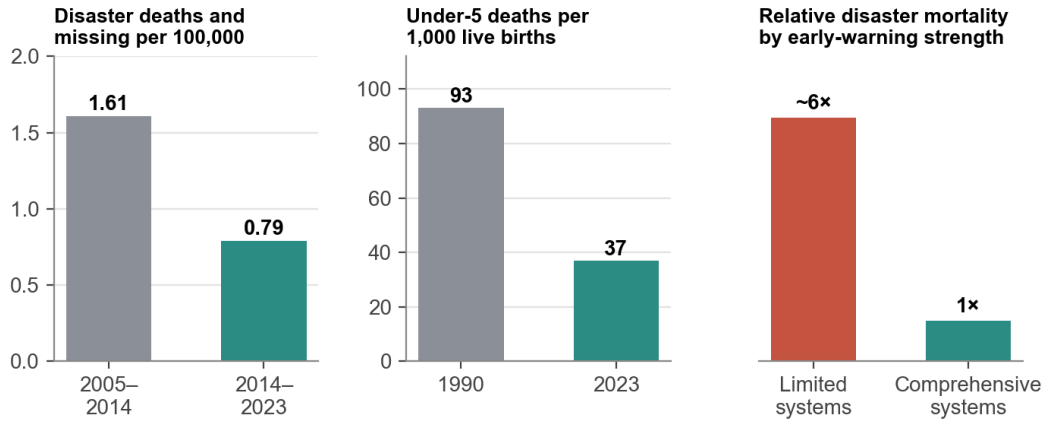


Figure 8. Signs that capability saves lives

Sources: UNDRR GAR 2025[16]; WHO[19]; WMO 2025[15]. Right panel shows relative mortality as reported by WMO (about six times lower with comprehensive systems); bar heights are illustrative of that ratio.

What the cases have in common

Putting these cases side by side, four ingredients recur whenever societies reduce losses:

1. **Knowledge:** forecasts, hazard maps, engineering standards and public health information.
2. **Physical systems:** safe buildings, shelters, power, water, clinics and communication networks.
3. **Institutions:** agencies, laws, trained volunteers and enforcement that turn knowledge into action.
4. **Money:** public budgets, insurance, savings and credit that pay for prevention and rebuilding.

A caution. These cases fit our proposition but do not prove it. Chile's quake was offshore, Sidr's timing in the tide cycle reduced its surge, and income is not the only difference between countries. The safest reading is that capability matters a great deal, and that societies can build it deliberately.

SECTION 6

Is Convergence Actually Happening?

Checking the evidence on catching up

If convergence is to serve as a resilience strategy, we should ask whether it is occurring and how fast. The evidence is mixed: there is real progress, but it is slower and more uneven than many people assume.

The long view: a reversal in the 1990s

For much of the twentieth century, economists were struck by how little poorer countries caught up. Studies from the 1990s found no general sign of it. A 2021 paper by economists Michael Kremer, Jack Willis and Yang You, "Converging to Convergence," updated the evidence with about 25 additional years of data.[12] They found a trend towards convergence in incomes from around 1990, becoming clearer after 2000. Two forces explain it: poorer countries grew faster than before, and the richest countries grew more slowly than they once did.[12]

The authors also found that many things that support growth, such as education, policies and institutions, have themselves converged toward better patterns.[12] They note that rates of catch-up remain modest: about 0.7% of the income gap per year between 2005 and 2015, well below the roughly 2% rate that earlier researchers once described as an "iron law" of convergence.[12] At that pace, closing half the gap would take roughly a century.

To see why such rates matter, Figure 9 shows how many years it takes to close *half* of an income gap at different speeds. At the recently measured pace, it takes about a century. At the faster pace once thought typical, it takes about 35 years.

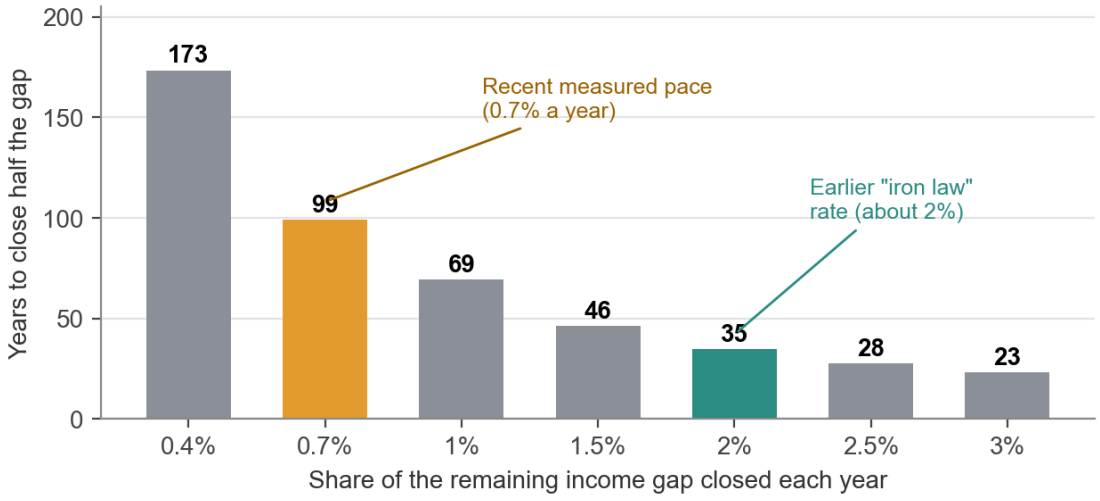


Figure 9. Years needed to close half of an income gap

Source: Author's calculation (years = ln 2 divided by the yearly rate of gap closure). Reference rates from Kremer, Willis and You.[12]

Progress is slowing where it matters most

The picture for the poorest places is harder. The World Bank projects that progress against extreme poverty is slowing, with only about 69 million people expected to leave extreme poverty between 2024 and 2030.[2] Poverty is increasingly concentrated: roughly two-thirds of the world's extreme poor in 2024 lived in Sub-Saharan Africa, a region with about 16% of the world's population.[2] These are also the places where, as Section 4 showed, hazards and capability gaps overlap most strongly.

> **WHY IT MATTERS FOR RESILIENCE**
> Overall convergence statistics can look encouraging while the people most at risk are left behind. A resilience strategy must look at **who is converging**, not just how fast the averages are moving.

Technology can move faster than income

There is a second, more encouraging pattern. Technologies can spread much faster than incomes rise, especially when their cost falls sharply. Mobile phones are the classic example: many countries skipped extensive landline networks and moved directly to mobile service and mobile money. Solar power may be repeating the story.

Pakistan imported about 17 gigawatts of solar panels in 2024 alone, and in the 12 months to June 2025 it imported more panels than the entire African continent, despite having only about one-sixth of Africa's population.[18] Africa's own imports of Chinese solar panels rose about 60% in a year to roughly 15 gigawatts, with 20 countries setting records.[18] Analysts at the energy think tank Ember describe this as the first evidence of a structural take-off, while also stressing that Africa is "not the next Pakistan, yet."[18]

The same does not yet hold for all technologies. Only about 23% of people in low-income countries use the internet, and only about 4% of people in low-income countries have 5G coverage, compared with 84% in high-income countries.[7] Affordability, not availability alone, is a major barrier in about 60% of low- and middle-income countries.[7]

A fair verdict

- **Convergence is real.** The long-run pattern since the 1990s has turned from drift apart to slow catch-up.
- **It is slower than the risks.** Climate and other hazards are intensifying on timescales of years to decades, while income convergence plays out over many decades.
- **It is uneven.** Gains have been concentrated in some regions, while the lowest-income countries are at risk of being left behind.
- **It is not automatic.** Rapid technology adoption, such as solar and mobile services, shows that deliberate policy and falling costs can speed things up.

This is why the report speaks of *accelerating* sustainable convergence. The base case is slow progress. The strategic question is whether policies and investments can speed it up in the places and domains where it most reduces risk.

SECTION 7

Five Pathways from Catching Up to Safety

How different kinds of progress protect people from many threats

Convergence is a broad idea, so it helps to break it into concrete pathways. We identify five that appear repeatedly in evidence on disasters, health and development. Each reduces vulnerability to several threats at once, which is what makes them especially valuable in a polycrisis. Figure 10 summarizes our assessment of how strongly each pathway helps against six broad kinds of threat.

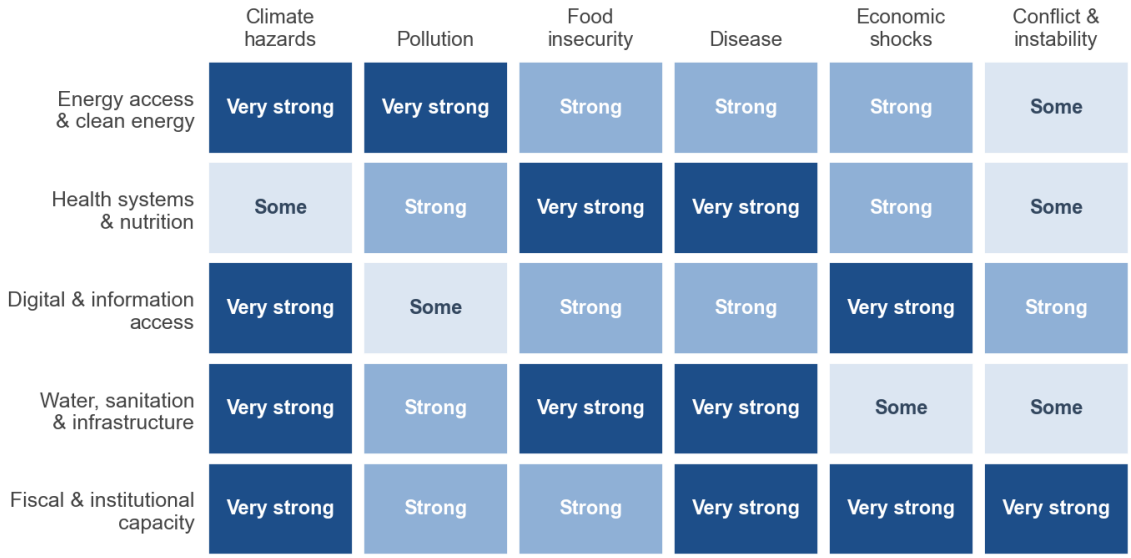


Figure 10. How strongly each pathway protects against each threat

Source: Author's qualitative assessment based on the evidence reviewed in this report; not a measured score. Darker cells mean stronger and more direct protection.

Pathway 1: Energy access and clean energy

Electricity is the quiet backbone of resilience. It powers clinics, vaccine refrigerators, water pumps, mobile networks and the machines that process food. Without it, even a minor storm can interrupt basic services. Roughly 666 million people still lack electricity and about 2.1 billion lack clean cooking.[4]

Clean energy adds a second benefit. Rooftop solar with batteries and small local grids can keep a clinic or water pump running when the main grid fails, and they are quicker to build than large power stations. Solar costs have fallen by roughly 90% since 2010, which is why panels are now spreading quickly in places like Pakistan and across Africa.[18] Clean cooking reduces indoor smoke, which protects lungs and frees time. Moving to cleaner energy also cuts the greenhouse gases that intensify hazards, which is why this pathway is vital to *sustainable* convergence.

Pathway 2: Health systems and nutrition

Healthy people withstand shocks better. Well-nourished children are less likely to die of disease after a flood. Strong primary care catches illness early and helps communities respond to outbreaks. Health systems that cover costs protect families from being pushed into poverty when someone falls ill: about 2.1 billion people faced financial hardship from health costs in 2022.[6]

Health convergence is also protection for everyone. Surveillance, laboratories and vaccination in every region mean outbreaks are caught earlier and are less likely to spread. The unequal arrival of vaccines during the COVID-19 pandemic showed that gaps in health capability can prolong a crisis for the whole world.

Pathway 3: Digital and information access

Information is a form of safety. A phone can carry a storm warning, a crop price, a weather forecast for a farmer, or a payment from a relief program. After disasters, governments and aid groups can send cash directly to people through mobile money, which is faster than moving goods. Telemedicine can reach remote clinics, and online education can continue when schools close.

With 2.2 billion people offline and low-income internet use at 23%, this pathway has a lot of room to grow.[7] New tools such as artificial intelligence for forecasting and crop advice could amplify benefits, but only if people have connectivity, devices, local-language tools and trusted data. Digital convergence also brings its own risks, such as cyber-attacks and dependence on foreign platforms, which good design must address.

Pathway 4: Water, sanitation and resilient infrastructure

Safe water and sanitation prevent a large share of preventable illness and make communities less fragile in floods and droughts. Roads, bridges, power lines, flood defences and telecoms keep help and supplies flowing when shocks hit. About 2.1 billion people lack safely managed drinking water and 3.4 billion lack safely managed sanitation.[5]

Infrastructure that is built to be resilient pays for itself. A 2019 World Bank study found that investing in more resilient infrastructure in low- and middle-income countries could deliver net benefits of about $4.2 trillion, or around $4 of benefit for every $1 invested.[17] The study also found that unreliable infrastructure already costs households and firms at least $390 billion a year in these countries.[17]

Pathway 5: Fiscal and institutional capacity

Money and institutions are the pathway that makes the others work. Governments with healthy tax revenue can build services, maintain them, set up social protection and keep emergency funds. Institutions such as weather agencies, building inspectors, courts and disaster agencies turn knowledge into action. Financial tools, from insurance to pre-arranged credit lines, give countries speed when disaster strikes.

Today this pathway has the largest gap in money terms. UNEP estimates that developing countries need roughly $310 to $365 billion a year by 2035 for adaptation, with actual international public flows near $26 billion.[8] The UN's disaster report finds that only about 2% of development aid goes to disaster risk reduction, even though some well-designed programs in low-income countries return up to ten dollars of benefit per dollar spent.[16]

Table 3. The five pathways at a glance

Pathway	What converges	How it lowers vulnerability	Illustrative evidence
Energy	Electricity, clean cooking, renewables	Keeps clinics, pumps and networks running; cuts household smoke; cuts emissions	666 million lack electricity; 2.1 billion lack clean cooking[4]
Health	Coverage, nutrition, financial protection	Fewer deaths from shocks; faster outbreak control	4.6 billion lack full essential coverage[6]
Digital	Connectivity, devices, skills	Carries warnings, cash and forecasts	2.2 billion offline; 23% use in low-income countries[7]
Water and infrastructure	Safe water, sanitation, roads, grids	Prevents illness; keeps help and supplies moving	$4 of benefit per $1 for resilient infrastructure[17]
Fiscal and institutional	Revenue, institutions, risk finance	Funds prevention; speeds recovery; enforces standards	Adaptation finance gap of $284–339 billion a year[8]

The pathways in action: a thought experiment

Consider a rural district hit by a cyclone. In a district with a solar-and-battery system, the clinic keeps its lights and vaccine fridge running. A phone alert, sent from a national weather service, arrived two days before landfall, so families moved to a shelter on higher ground. After the storm, mobile money lets the government send cash to families within days, and clean water kept disease from spreading. Fiscal reserves and an insurance payout pay for repairs. Now take away any single link: without power, the clinic loses its vaccines; without connectivity, the warning never arrives; without finance, repairs wait for years. This is a simplified example, but it shows why the pathways are strongest in combination.

Where to start: sequencing the pathways

No country can close every gap at once, so sequencing matters. A practical rule is to begin with capabilities that are cheap, quick and protective against many threats, such as early warning, clean cooking, safe water and primary care, and to build the slower, larger systems, such as grids, industry and tax capacity, in parallel. Early gains build trust and free up time and money for the long-term work.

These pathways reinforce each other. Power makes connectivity possible. Connectivity improves health and financial services. Stronger finances pay for water and infrastructure. That interconnection is exactly why convergence can reduce vulnerability to *connected* threats better than fixing one problem at a time.

SECTION 8

The Development–Resilience Loop

Why progress and protection feed each other, in both directions

So far we have described convergence as leading to resilience. In reality, causation runs both ways. Development makes societies safer, and safety makes development possible. This two-way link can generate a virtuous cycle, but it can also lock countries into a trap. Understanding both is central to the strategy.

The virtuous cycle

Four reinforcing links connect development and resilience:

- **Greater resilience protects economic development from disruption.** When a bridge survives the flood, a harvest is insured, or a clinic stays open, growth continues rather than being reset.
- **Continued development increases the resources available for resilience.** Higher incomes and tax revenue pay for better prevention and faster recovery.
- **Technological diffusion accelerates both processes.** Cheap solar, mobile networks and better forecasting spread across countries, raising incomes and safety together.
- **Reduced vulnerability improves the continuity of development.** Children stay in school, workers stay healthy and savings are preserved, so long-term investments in skills and businesses can pay off.

Taken together, these links create the possibility of a **reinforcing development–resilience cycle**, in which progress in one area strengthens progress in the other.

The vulnerability trap

The same logic can work in reverse (Figure 11). Where incomes are low and services are weak, a hazard causes large losses. Losses drain household savings and government budgets. With little left to invest in prevention, the next hazard causes large losses again. Researchers sometimes call this a *poverty trap* or *disaster-poverty cycle*.

Several features make traps especially hard to escape:

- **Losses are fast and gains are slow.** A flood can erase in a day what took a decade to build. Rebuilding takes much longer than destruction.
- **Recovery displaces development.** Money spent on repairs is money not spent on new schools, roads or factories.
- **Damage to people is long-lasting.** Children who miss school or suffer malnutrition during a crisis can carry the effects for life, and families may sell tools or land that are hard to buy back.
- **Debt compounds.** Countries that borrow after each disaster can end up spending more on interest than on prevention.

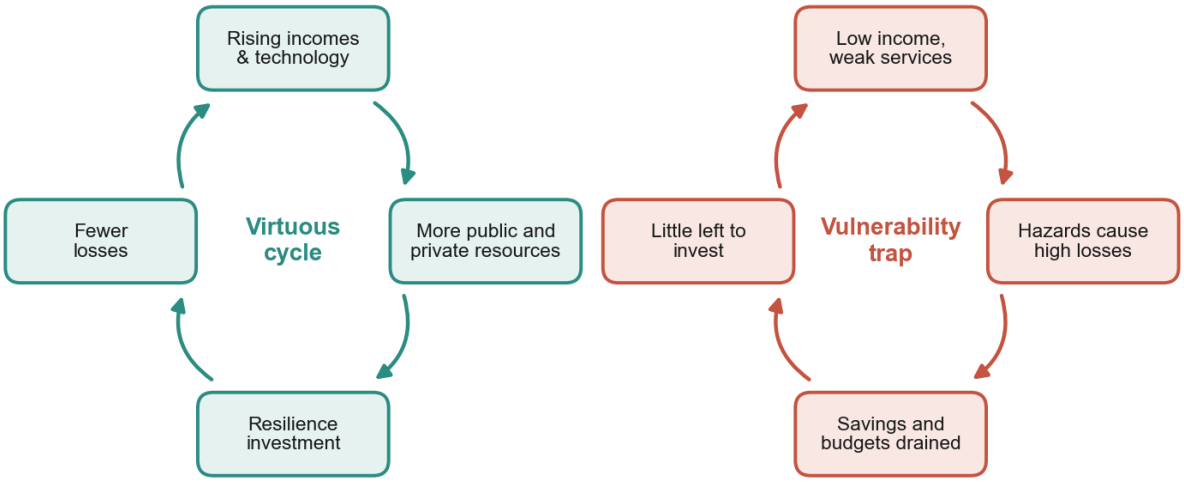


Figure 11. Two loops: the virtuous cycle and the vulnerability trap
Source: H Heuristics framework.

Tipping points and the value of acting early

Loops can have thresholds. A country that crosses a certain level of capability, such as reliable power, a functioning tax system and basic health coverage, may find the virtuous cycle becomes self-sustaining. Below that level, shocks may repeatedly knock it back. This pattern suggests that timing matters: resilience investments made *before* crises are usually cheaper and more effective than emergency responses afterward. The UN's disaster report makes the same point, finding that every dollar of well-targeted prevention can return several dollars in avoided losses.[16]

What this means for strategy

1. **Front-load the survivability basics.** Early investments in warnings, safe water, power and primary care help societies escape traps sooner.
2. **Protect the gains.** Maintenance, insurance and social protection stop development from being reversed by shocks.
3. **Aim for threshold effects.** Concentrate effort so communities reach levels of capability that become self-sustaining, rather than spreading resources too thinly.
4. **Watch both directions.** Track not only incomes but also whether losses are shrinking, because falling losses are the sign that the loop is turning virtuous.

SECTION 9

The Convergence Resilience Dividend

A proposed way to measure the safety gained by narrowing gaps

If convergence helps societies cope with threats, that benefit should be measurable. This section introduces a proposed H Heuristics concept to describe it, and sets out how it could be tracked.

Proposed H Heuristics concept

The Convergence Resilience Dividend

The cumulative reduction in systemic vulnerability and improvement in human development capabilities associated with narrowing development disparities.

Where the idea comes from

The term builds on the notion of a "resilience dividend," popularized by Judith Rodin in her 2014 book of that name, which describes the extra benefits that arise when investments make people and places better able to withstand shocks.[21] The Convergence Resilience Dividend narrows this to one source of benefit: the *reduction of gaps between countries and groups*. It asks how much safer humanity becomes because capability is spread more evenly. "Cumulative" signals that benefits build over time, and "associated" that many factors affect vulnerability, so convergence should not be credited with everything.

Three layers of measurement

A practical measure would track three layers, from causes to consequences. Table 4 lists ten starting indicators.

1. **Capability indicators (the inputs).** Are gaps in income, energy, health, digital access, water and finance narrowing between countries?
2. **Vulnerability indicators (the middle).** Are people and systems becoming less sensitive to shocks and better able to adapt?
3. **Outcome indicators (the results).** Are preventable deaths, displacement and income losses from shocks falling?

Measuring convergence itself

Two simple measures show whether gaps are narrowing. The first is a **ratio**: divide the level in lower-income countries by the level in high-income countries. For internet use today (23% versus 94%) the ratio is about 0.24, and progress shows up as the ratio moving toward 1. The second is the **absolute gap**, such as the number of people lacking electricity, which matters because a ratio can improve while large numbers are still left out.

Table 4. Candidate indicators for the Convergence Resilience Dividend

Indicator	What it measures	Example data source
GDP per capita convergence	Economic catch-up	World Bank World Development Indicators
Labor productivity convergence	Productive capacity	International Labour Organization
Electricity access	Energy development	Tracking SDG7 report[4]
Clean cooking access	Household pollution reduction	Tracking SDG7; WHO[4]
Healthcare access	Health resilience	WHO–World Bank UHC index[6]
Internet penetration	Digital convergence	ITU[7]
Water and sanitation access	Basic survivability	WHO/UNICEF JMP[5]
Renewable energy share	Energy transition	IEA, IRENA, Ember
Climate adaptation capacity	Environmental resilience	ND-GAIN Index[22]; UNEP[8]
Disaster mortality	Human vulnerability	EM-DAT[10]; UNDRR Sendai monitor[16]

From indicators to a dividend

The dividend itself is a comparison between two worlds: one where convergence follows its current path and one where it is faster. For each outcome of interest, the dividend is the difference in expected harm between the two. In words:

> **THE DIVIDEND IN PLAIN WORDS**
>
> **Convergence Resilience Dividend** = (expected losses and preventable deaths if convergence stays on its current path) minus (expected losses and preventable deaths if convergence is accelerated), counted over a chosen period, in the same hazard conditions.

Holding hazards constant in both worlds isolates the contribution of capability from changes in the threats themselves. Real hazards will not stay constant, so a full study would repeat the comparison under several hazard scenarios.

Measured versus modeled

A credible analysis must be transparent about what is known and what is assumed. We suggest three labels: **measured** (observed data, such as people with electricity or deaths in a past disaster, with source and year), **estimated** (values inferred from statistical relationships in past data, with confidence ranges), and **modeled** (forward-looking scenario results, always shown with ranges and assumptions). Section 10 applies this approach to a simple scenario.

SECTION 10

A Scenario Exercise: Baseline versus Accelerated Convergence

A simple, transparent illustration of how the dividend could be estimated

To make the idea concrete, we ran a deliberately simple scenario exercise that compares two futures through 2050 and 2100. **It is a stylized illustration, not a forecast.** Its purpose is to show the logic of the dividend and to expose the assumptions that matter, so that future work can replace them with better ones.

The two scenarios

- **Baseline scenario:** existing development and technology-diffusion trajectories continue. Catch-up proceeds at a historically modest pace, consistent with the slow convergence documented in Section 6.[12]
- **Accelerated convergence scenario:** targeted investments speed up economic, technological, infrastructure and human development convergence, roughly three times as fast as the baseline.

How the model works

The model has three simple steps, all described in plain terms here so they can be checked and challenged.

1. **Income catch-up.** A "catching-up group" of lower-income economies starts with a stylized income of $8,000 per person (adjusted for living costs), while a "frontier group" starts at $60,000 and grows 1.2% a year. Each year, the catching-up group closes a fixed share of its remaining gap to the frontier. That share is 0.7% a year in the baseline and 2.0% in the accelerated scenario.
2. **From income to vulnerability.** We assume vulnerability to disaster deaths falls as income rises, with a sensitivity (an "elasticity") of 0.6 in the central case. That means a doubling of income lowers vulnerability by about one third. We test values from 0.3 to 1.0.
3. **The dividend.** We compare the vulnerability index (set to 100 in 2025) in the two scenarios. The percentage difference is the dividend. Hazard and exposure are held constant to isolate the effect of capability.

Results: incomes

In the baseline, the catching-up group's income rises from $8,000 to about $15,000 by 2050 and $45,000 by 2100, still well below the frontier. In the accelerated scenario it reaches about $24,000 by 2050 and $94,000 by 2100, narrowing the gap to the frontier from about 13% of frontier income today to 64% by 2100 (versus 30% in the baseline). Shaded bands in Figure 12 show the ranges for the catch-up speeds tested.

Table 5. Key assumptions and the ranges tested

Assumption	Central value	Range tested	Why this range
Starting income, catching-up group	$8,000	Fixed	Stylized average for lower-income economies
Starting income, frontier group	$60,000	Fixed	Stylized average for high-income economies
Frontier growth per year	1.2%	Fixed	Modest long-run growth at the frontier
Gap closed per year, baseline	0.7%	0.4% – 1.0%	Close to measured recent convergence rate[12]
Gap closed per year, accelerated	2.0%	1.5% – 2.5%	Near the historic "iron law" rate of about 2%[12]
Income-to-vulnerability sensitivity	0.6	0.3 – 1.0	Assumption; evidence suggests a negative link but with wide variation

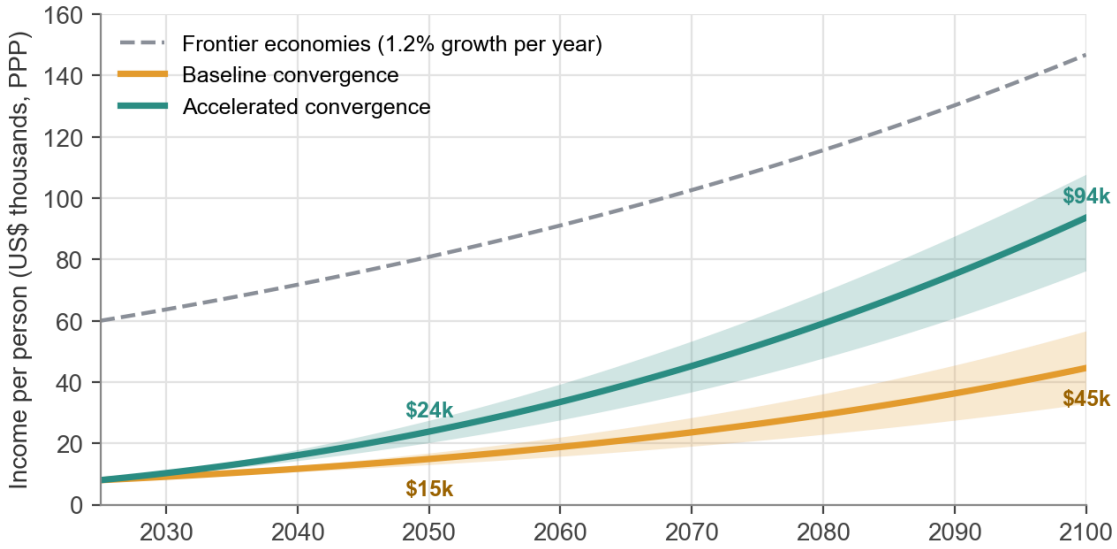


Figure 12. Illustrative income paths under baseline and accelerated convergence
Source: H Heuristics illustrative model. Stylized values; not a forecast.

Results: vulnerability and the dividend

Using the central assumptions, the vulnerability index falls from 100 today to about 69 by 2050 in the baseline, and to about 52 in the accelerated scenario. By 2100 the figures are about 36 and 23 (Figure 13). The ranges are wide because the outcome depends on how fast catch-up occurs and on how strongly vulnerability responds to income.

The Convergence Resilience Dividend in this exercise is the percentage by which vulnerability is lower in the accelerated scenario than in the baseline. The central estimate is about **25% by 2050** and **36% by 2100**. Combining the least favorable and most favorable assumptions gives a plausible range of roughly 5% to 53% in 2050 and 9% to 69% in 2100 (Figure 14).

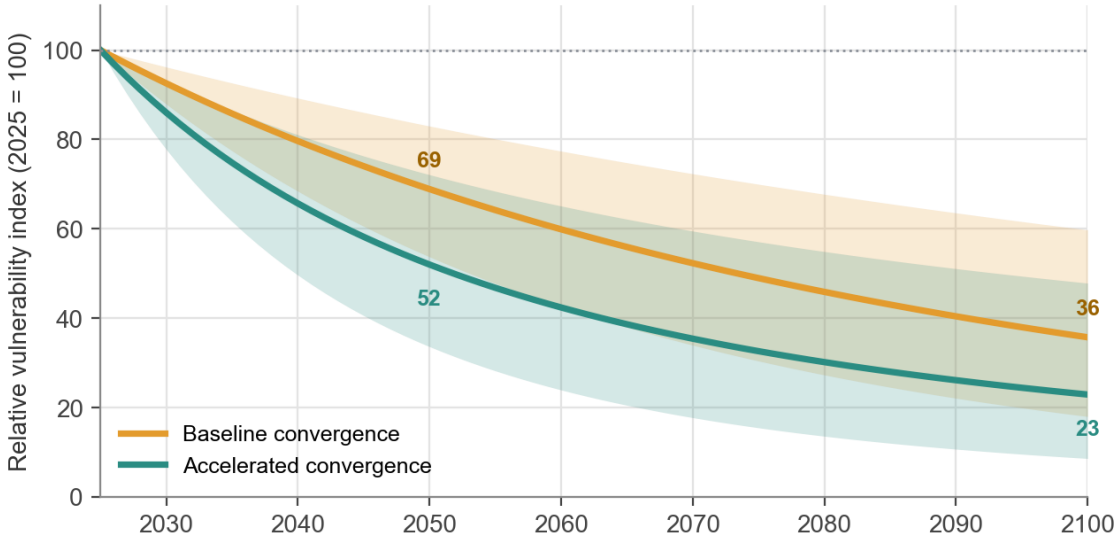


Figure 13. Relative vulnerability to disaster mortality, holding hazards constant

Source: H Heuristics illustrative model. Index: 2025 = 100. Lines show central assumptions; bands show the ranges in Table 5.

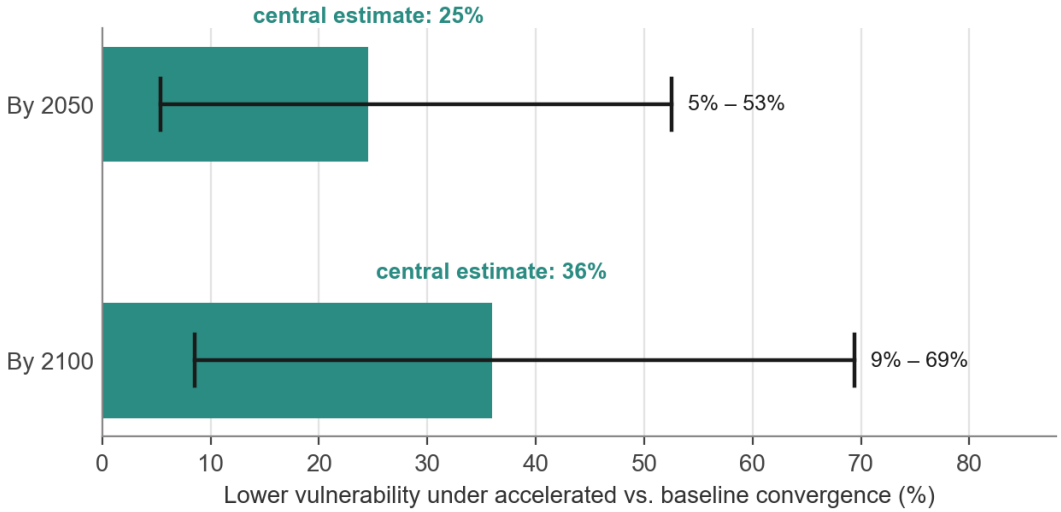


Figure 14. The illustrative dividend: how much lower vulnerability is under accelerated convergence

Source: H Heuristics illustrative model. Whiskers show the range from least to most favorable assumptions.

Table 6 shows how the dividend changes with the two assumptions that matter most: how fast the accelerated scenario closes the gap, and how strongly vulnerability responds to income. Each cell gives the result for 2050 and 2100.

Table 6. The dividend (percent lower vulnerability) under different assumptions, 2050 / 2100

Income-to-vulnerability sensitivity	Accelerated gap closure: 1.5% a year	2.0% a year (central)	2.5% a year
0.3	9% / 15%	13% / 20%	17% / 23%
0.6 (central)	17% / 28%	25% / 36%	31% / 41%
1.0	26% / 42%	37% / 52%	46% / 59%

How to read these results

- **The direction is robust; the size is not.** Under every combination tested, accelerated convergence lowers vulnerability relative to the baseline. How much is uncertain.
- **The dividend grows with time.** Benefits compound, so they are larger by 2100 than by 2050.
- **The result depends on the assumed link from income to vulnerability.** That link is the weakest and most important assumption. Real-world evidence on it is mixed, and it varies by hazard and by country.
- **These are relative vulnerability scores, not death counts.** Converting them into lives saved would need hazard projections, population change and local data.

> **TAKEAWAY FOR DECISION-MAKERS**
> Even a modest link between income and safety, combined with faster catch-up, produces a meaningful dividend. The case for acting does not hinge on precise numbers. It hinges on whether capability gaps cause preventable harm, which the evidence in Sections 4 and 5 strongly suggests.

What the model leaves out

The model ignores many things that matter. A fuller study would need to add them:

- **Changing hazards**, especially climate hazards that grow over time, and **rising exposure** as populations and assets increase.
- **Differences within groups**, including inequality inside countries and the gap between cities and rural areas.
- **Targeted programs** that cut risk faster than income growth would, such as early warning or building codes.
- **Feedback from reduced losses to higher growth** (Section 8), which would make the dividend larger.

How a full study would proceed

A full study would use richer tools: integrated assessment models that link economies and climate, the Shared Socioeconomic Pathways used by climate researchers, sector models for health, energy and agriculture, and country case studies. It would report results as probability ranges rather than single lines, and it would be reviewed openly by outside experts. The aim of this report's exercise is not to replace that work but to show what questions it must answer.

SECTION 11

Limits, Risks and Caveats

What could go wrong, and how to guard against it

A strong idea should be tested against its weaknesses. This section lays out the main reasons the convergence-as-resilience proposition might fall short, and what they imply for how it is used.

1. Convergence is not automatic

Historically, many countries have stagnated, and the long-run pattern of convergence is recent and modest.[12] Treating convergence as inevitable would be a mistake. It requires peace, sound governance, investment and open access to technology, and it can be derailed by conflict, debt crises or shocks.

2. Growth can increase hazards

If catching up depends heavily on fossil fuels, destructive land use or heavy pollution, it could intensify climate hazards and environmental damage that fall on everyone. That is the reason for the word *sustainable*. The faster cost declines in clean technologies make low-carbon convergence more feasible than in earlier eras, but this is a policy choice, not a given.

3. Exposure can grow as fast as capability

As economies grow, more people and assets move into harm's way, for example through urban growth in flood-prone coasts. Rising capability can be partly offset by rising exposure. Good planning, land-use rules and nature-based protection are needed so that growth does not simply build more to lose.

4. Averages can hide inequality

Country-level convergence may leave out the poorest regions, informal settlements, minorities and women, who are often the most vulnerable. A resilience-focused approach must track *who* gains, not only national averages.

5. Income is not the only ingredient

Chile and Haiti differed in wealth, but also in institutions, enforcement and governance. Bangladesh made large gains in safety at low income thanks to organization and community trust. Capability depends on how well money and technology are used, so the link from income to safety is partial and varies widely between places.

6. Correlation versus causation

Richer countries tend to have lower disaster mortality, but some of that may reflect geography, history or institutions that also produced wealth. Our scenario assumes a causal link from income to vulnerability, which is plausible but not precisely measured. Better research can narrow this uncertainty, for example by comparing countries before and after specific policy changes.

7. Dependence and new risks

Catching up through imported technology can create new dependencies on foreign suppliers, platforms or finance. Digital systems introduce cyber risks. Debt-financed investment can backfire if repayment crowds out essential spending. Convergence strategies should build local skills, diversify suppliers and keep debt manageable.

8. Data are imperfect

The sources used in this report differ in definitions and years, and some statistics are revised frequently. For example, the World Bank's change to its poverty line in 2025 shifted headline poverty counts without any change in people's real circumstances.[3] Some disaster statistics, such as the income breakdown of deaths, rely on older data. Any dividend measure must be built on consistent, transparent data and updated as better figures arrive.

9. Survivability is not the whole story

The proposition focuses on survivability because it can be defined and measured. But people's lives are about more than survival: dignity, freedom, culture and opportunity matter too. Convergence should be pursued with attention to local priorities and voice, not imposed as a technical project.

10. The clock problem

Hazards are intensifying over years to decades, while income convergence unfolds over many decades (Section 6). Broad growth alone cannot protect people in the next ten years. That is why the targeted route (Section 3) and efforts to reduce hazards must run alongside it.

11. Who pays, and who decides

Closing capability gaps costs money, and the adaptation finance gap alone runs to hundreds of billions of dollars a year.[8] Aid budgets, debt terms and political will all affect whether funding arrives. Convergence also needs local ownership: projects designed without communities often fail once outside support ends.

WHAT WOULD CHANGE OUR MIND

The proposition would be weakened by: (1) careful studies finding little causal effect of income or services on disaster deaths; (2) evidence that exposure grows faster than capability in fast-growing economies; (3) targeted programs that cannot be scaled or sustained; or (4) convergence paths that raise hazards faster than they reduce vulnerability. We encourage tests of each.

BOTTOM LINE ON LIMITS

These caveats do not weaken the central logic. They sharpen it. The right claim is that **well-designed, sustainable and inclusive** convergence is a potentially significant tool for reducing global vulnerability, alongside hazard reduction, good governance and international cooperation.

SECTION 12

Action Agenda and Conclusion

What different actors can do to turn the idea into practice

If convergence is a resilience strategy, it should change how decisions are made. This section sets out practical steps, a screening test for investments, a research agenda and a closing summary.

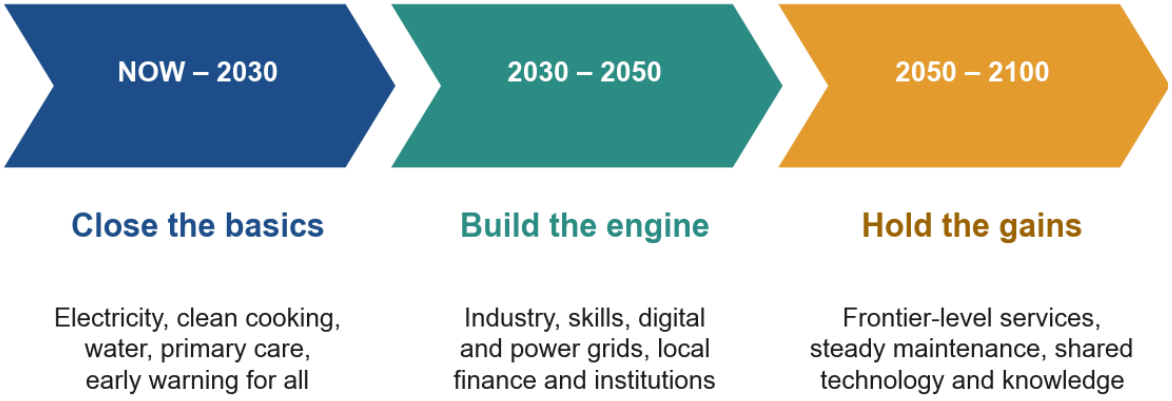


Figure 15. Three time horizons for convergence-driven resilience
Source: H Heuristics framework.

What each group can do

Table 7. Priority actions by actor

Actor	Priority actions
Governments in lower-income countries	Put survivability basics first (warnings, clean cooking, water, primary care); enforce building and land-use rules; build local weather, health and engineering institutions; protect maintenance budgets.
Governments and donors in wealthier countries	Close the adaptation finance gap, especially with grants for the poorest countries; raise the share of aid for disaster prevention; support technology transfer and training.
Development banks and financial institutions	Offer long-term, low-cost finance for resilient infrastructure; expand disaster-linked credit lines and insurance; lower borrowing costs for clean energy; allow repayment pauses after disasters.
Companies and investors	Invest in distributed solar and storage, mobile finance and low-cost health and water technology; design affordable, repairable products; train local workers and suppliers.
Researchers, media and civil society	Build transparent data on capability gaps and disaster outcomes; test the income-to-vulnerability link; track who benefits; give communities a voice in setting priorities.

A simple screening test for investments

Decision-makers can ask seven questions to judge whether a project builds sustainable convergence and resilience. The more "yes" answers, the stronger the case.

1. Does it close a gap in a capability that is **critical to survival**?
2. Does it protect against **more than one** kind of threat?
3. Does it reach the **most exposed and least resourced** people?
4. Is it **low-carbon** and does it avoid harming nature?
5. Will it be **maintained** and funded after the launch period?
6. Does it build **local skills and institutions**, not only physical assets?
7. Can its results be **measured** using the indicators in Table 4?

Research agenda for H Heuristics

- **Build the indicator dashboard** described in Table 4 and track it over time, with clear labels for measured, estimated and modeled values.
- **Estimate the income-to-vulnerability link** using historical disaster, health and development data across countries and regions.
- **Upgrade the scenario exercise** with hazard projections, exposure growth and multiple socioeconomic pathways.
- **Study targeted routes** by comparing countries that raised safety faster than incomes, such as Bangladesh.
- **Map pathway interactions** to find the highest-leverage combinations of power, connectivity and finance.
- **Quantify the cost of delay** by comparing action in 2030 with action in 2040.

Conclusion

The central message of this report is simple. A polycrisis is made dangerous by the connections between threats, and it is made deadlier by the uneven distribution of the capacity to cope. Because capability can be built, and because it already has been built in places like Bangladesh and Chile, the gaps are not destiny.

In this view, convergence in income, technology, environment and human development is a form of risk reduction for the whole world. Closing gaps in energy, health, digital access, water, infrastructure and public finance would let more people detect danger, absorb shocks and recover, and would strengthen the global systems everyone depends on. Our illustrative scenario suggests the effect could be substantial, though its size is uncertain and must be tested with better data and models.

The strategic implication is to treat sustainable convergence as part of the core toolkit for managing global risk, next to cutting emissions, preventing conflict and protecting nature. The world cannot remove every threat, but it can make sure that when threats arrive, fewer people face them without the means to survive. That is the promise of the Convergence Resilience Dividend.

REFERENCE

Glossary of Key Terms

Plain-language definitions

Term	Meaning in this report
Adaptive capacity	The ability of people, communities and governments to prepare for, respond to and recover from shocks and to adjust over time.
Capability gap	The difference between the services, technologies and resources available to different groups, such as access to electricity, health care or the internet.
Convergence	The process by which lower-income places catch up with higher-income places in income, technology, environmental quality and human development.
Convergence Resilience Dividend	The proposed H Heuristics measure of the cumulative reduction in systemic vulnerability and improvement in human development capabilities associated with narrowing development disparities.
Elasticity	A measure of how strongly one thing responds to another. An elasticity of 0.6 means a 10% rise in income is associated with about a 6% fall in vulnerability.
Exposure	The people, buildings, farms and systems that lie in the path of a hazard.
Hazard	A potentially harmful event or trend, such as a flood, heat wave, disease outbreak or price shock.
Polycrisis	A situation in which crises in multiple global systems are causally entangled, making each other worse and reducing humanity's prospects.
PPP (purchasing power parity)	A way of comparing incomes across countries that adjusts for differences in the cost of living.
Resilience	The ability to absorb shocks, keep functioning, recover and adapt.
Survivability	In this report, the likelihood that people avoid preventable death and lasting harm when shocks occur.
Sustainable convergence	Catching up that is low-carbon, nature-positive and inclusive and lasting.
Systemic risk	Risk that spreads through connected systems so that a local shock can have wide effects.
Vulnerability	How badly exposed people and systems are harmed by a hazard, based on their sensitivity and ability to cope.

REFERENCE

Sources and References

Numbered to match citations in the text

[1] Lawrence, M., Homer-Dixon, T., Janzwood, S., et al. (2024). Global polycrisis: the causal mechanisms of crisis entanglement. *Global Sustainability*. https://doi.org/10.1017/sus.2024.1

[2] World Bank (2024). *Poverty, Prosperity, and Planet Report 2024: Pathways Out of the Polycrisis*. https://openknowledge.worldbank.org/entities/publication/e789cf0e-816c-41ef-ad3a-471948f374ce/full

[3] Our World in Data (2025). Tracking how many people live on less than $3, $10, or $30 a day. https://ourworldindata.org/tracking-how-many-people-live-on-less-than-3-10-or-30-a-day

[4] IEA, IRENA, UN Statistics Division, World Bank and WHO (2025). *Tracking SDG 7: The Energy Progress Report 2025*. https://www.irena.org/Publications/2025/Jun/Tracking-SDG-7-The-Energy-Progress-Report-2025

[5] WHO and UNICEF Joint Monitoring Programme (2025). *Progress on Household Drinking Water, Sanitation and Hygiene 2000–2024: Special Focus on Inequalities*. https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health/monitoring-and-evidence/wash-monitoring

[6] WHO and World Bank (2025). *Universal Health Coverage Global Monitoring Report 2025* (news release, 6 December 2025). https://www.who.int/news/item/06-12-2025-most-countries-make-progress-towards-universal-health-coverage-but-major-challenges-remain-who-world-bank-report-finds

[7] International Telecommunication Union (2025). *Measuring Digital Development: Facts and Figures 2025*. https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx

[8] UNEP (2025). *Adaptation Gap Report 2025: Running on Empty*. https://www.unep.org/resources/adaptation-gap-report-2025

[9] CRED and UNISDR (2015). *The Human Cost of Natural Disasters: A Global Perspective*. https://preparecenter.org/resource/the-human-cost-of-natural-disasters-a-global-perspective

[10] CRED (2025). *2024 Disasters in Numbers* and EM-DAT annual report. https://files.emdat.be/reports/2024_EMDAT_report.pdf

[11] Rentschler, J., Salhab, M. and Jafino, B. A. (2022). Flood exposure and poverty in 188 countries. *Nature Communications*. https://doi.org/10.1038/s41467-022-30727-4

[12] Kremer, M., Willis, J. and You, Y. (2022). Converging to Convergence. *NBER Macroeconomics Annual 2021*, vol. 36. https://www.nber.org/books-and-chapters/nber-macroeconomics-annual-2021-volume-36/converging-convergence

[13] Florida International University, Extreme Events Institute. Haiti vs. Chile case study; and ScienceDaily (2011) on the 2010 earthquakes. https://eei.fiu.edu/case_study/haiti-vs-chile/

[14] The Conversation (2020). Bangladesh has saved thousands of lives from a devastating cyclone; The Business Standard (2021). 50 years of cyclone preparedness. https://theconversation.com/bangladesh-has-saved-thousands-of-lives-from-a-devastating-cyclone-heres-how-139903

[15] World Meteorological Organization (2025). *Global Status of Multi-Hazard Early Warning Systems 2025*. https://wmo.int/publication-series/global-status-of-multi-hazard-early-warning-systems-2025

[16] UNDRR (2025). *Global Assessment Report on Disaster Risk Reduction 2025: Resilience Pays*. https://www.preventionweb.net/news/billions-trillions-flagship-un-report-reveals-true-cost-disasters-and-how-reduce-them

[17] World Bank and GFDRR (2019). *Lifelines: The Resilient Infrastructure Opportunity* (press release). https://unfccc.int/node/198157

[18] Ember (2025). Africa's solar imports surge 60%, giving the first evidence of a take-off in solar in Africa. https://ember-energy.org/latest-updates/africas-solar-imports-surge-60-giving-the-first-evidence-of-a-take-off-in-solar-in-

africa/

[19] WHO Global Health Observatory. SDG target 3.2: newborn and child mortality; UN IGME child mortality estimates. https://www.who.int/data/gho/data/themes/topics/sdg-target-3_2-newborn-and-child-mortality

[20] IPCC (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Working Group II contribution to the Sixth Assessment Report. https://www.ipcc.ch/report/ar6/wg2/

[21] Rodin, J. (2014). *The Resilience Dividend: Being Strong in a World Where Things Go Wrong*. PublicAffairs.

[22] University of Notre Dame Global Adaptation Initiative. ND-GAIN Country Index. https://gain.nd.edu/

[23] Government of Pakistan, World Bank, UN and partners (2022). *Pakistan Floods 2022: Post-Disaster Needs Assessment* (UNDP press release, 28 October 2022). https://www.undp.org/pakistan/press-releases/pdna-pakistan-floods

ABOUT THE DATA

Figures were checked against the sources above in November 2026. Numbers are rounded and drawn from different years. Where sources disagree, we cite the most recent or most authoritative figure and describe ranges. The scenario results in Section 10 are produced by the H Heuristics illustrative model and are not published statistics.

SUGGESTED CITATION

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