

H HEURISTICS

Navigating a Changing World

RESEARCH REPORT

The 21st Century

Convergence, Polycrisis, and the Great Rebalancing of Human Civilization

Demography, Asia and Africa's rise, technology and AI, climate, pollution and biodiversity, geopolitics, and whether progress can outpace systemic risk: a forward analysis to 2100

H Heuristics · Hunter Hughes

Research Report · October 2026

Abstract

The twenty-first century is being shaped by the collision of two very different kinds of change. The first is a historic convergence: living standards, life expectancy, education, and technological capability are spreading from a small group of wealthy countries to most of humanity, and the centre of economic gravity is moving to Asia and, later in the century, toward Africa. The second is a rising load of systemic risk: a warming and increasingly unstable climate, pollution and ecosystem loss, resource and supply-chain concentration, sovereign debt stress, geopolitical fragmentation, and powerful new technologies whose governance lags their diffusion. This report asks which of the two will set the terms of the century.

The report examines the major forces in turn: the relative decline of Western dominance and the rebalancing of global power; the Asian century and its demographic limits; Africa's demographic rise; economic convergence across the Global South; ageing, peak population, and migration; artificial intelligence and automation; energy systems and industrial transformation; climate change; pollution and human health; biodiversity and ecosystem stability; geopolitics and multipolarity; cities and infrastructure; and human exposure and survivability risk. It then assesses how these forces interact through a polycrisis lens, evaluates sustainable development as a form of risk mitigation, sets out regional outlooks to 2100, and builds three scenarios: a convergence future, a fracture future, and a most-likely path of uneven muddling through.

The central finding is that the century is neither a story of inevitable progress nor of inevitable collapse. Convergence is real, powerful, and largely demographic and technological in origin; the clean-energy cost curve, falling fertility, rising education, and the diffusion of digital tools are all moving in a favourable direction. But the same forces that raise prosperity also raise exposure, and the interactions among climate, finance, geopolitics, and technology can turn a manageable shock into a cascade. Whether progress outpaces risk depends less on any single breakthrough than on three variables: the speed of the energy transition, the quality of institutions in the fast-growing parts of the world, and the capacity of the great powers to avoid the few catastrophic tail events, above all major-power war, from which no amount of convergence can recover. Our most-likely scenario is a century of continued but unequal progress with a temperature overshoot, recurring regional crises, and a multipolar order that is more contested than the one it replaces.

Keywords: global convergence; polycrisis; systemic risk; multipolarity; Asian century; Africa demographic dividend; Global South; population ageing; peak population; artificial intelligence; energy transition; climate change; pollution; biodiversity loss; urbanization; migration; survivability risk; sustainable development; scenarios to 2100

JEL classification: O11, O19, O57, F01, F02, J11, Q54, Q56, O33; economic development, global outlook, demographic trends, climate and environment, technological change

Data and method: This report synthesises institutional and peer-reviewed research, including UN *World Population Prospects 2024*, IMF *World Economic Outlook* data, the IPCC, WMO, and UNEP climate assessments, IEA and IRENA energy data, the *State of Global Air 2024*, the *Living Planet Report 2024*, the *WEF Global Risks Report 2026*, and Ord's *The Precipice*. Quantitative claims are attributed inline and rounded. Figures 1, 5, 13, 14, and 18 are conceptual or illustrative constructs, not forecasts; the remaining figures are approximate series read from the cited sources. The report is analytical rather than predictive, and projections to 2100 are scenario-conditional and uncertain.

Contents

1. Executive Summary	6
Key findings.....	6
Assessment: can convergence outpace systemic risk?	7
2. Introduction: The Defining Century	8
Two stories that are both true	8
The polycrisis lens	8
How this report is organised	9
3. The Great Rebalancing of Global Power.....	10
The shape of the shift.....	10
What rebalancing does and does not mean.....	11
The dimensions of power.....	11
4. The Future of the Western World.....	12
Demography is the first constraint.....	12
Productivity and the innovation advantage.....	12
Fiscal and political strain	12
Three possible paths	13
5. The Asian Century	14
The demographic arc	14
Sources of strength	15
Sources of vulnerability	15
An Asian half-century.....	15
6. Africa's Demographic Rise	16
The dividend is conditional	16
The enabling conditions.....	17
Africa and the world	17
7. Convergence and the Global South	18
The arithmetic of catching up.....	18
Why the old path is narrower.....	19
The Global South's three constraints	19
Opportunities for leapfrogging	19
8. Population, Aging, and Migration	20

Ageing is the dominant fact.....	20
Migration as the balancing mechanism	21
9. Technology, AI, and Automation	22
The productivity question	22
Jobs, inequality, and the development ladder	23
Concentration, energy, and governance.....	23
10. Energy, Resources, and Industrial Transformation	24
Why the transition is still not fast enough	24
Minerals, supply chains, and the new geography of energy	25
Industrial transformation and the Global South.....	25
Food, water, and land.....	25
11. Climate Change and Adaptation.....	26
Impacts: economic, human, and Earth-system	26
Adaptation: the necessary complement	27
12. Pollution and Human Health	28
Pollution as the leading environmental risk.....	28
Emerging health risks	29
13. Biodiversity and Ecosystem Stability	30
Why ecosystem stability matters economically.....	30
The planetary boundaries picture.....	31
Coral reefs, tipping points, and the case for action.....	31
14. The Global Polycrisis Framework	32
The 2020s as a natural experiment	32
Mapping the interactions	32
Amplifiers and dampeners	34
Can progress outpace systemic risk?	34
15. Geopolitics and Multipolarity.....	36
What multipolarity looks like	36
Economic fragmentation and its costs	36
The tail risk that overrides convergence	37
16. Cities, Infrastructure, and Urbanization.....	38
The economics of cities	38
Heat, flood, and resilience	39

Cities as decarbonisation levers	39
17. Human Exposure and Survivability Risk	40
Tier 1 and 2: the exposure picture	40
Tier 3 and 4: the tail risks	40
How to think about survivability	41
18. Sustainable Development as Risk Mitigation.....	42
Development as vulnerability reduction.....	42
Triple-duty investments.....	43
Why the agenda stalls, and what changes it	43
19. Regional Outlooks to 2100	44
20. Alternative Futures: Best, Worst, and Most Likely Scenarios	45
Scenario A: Resilient convergence (about 20 per cent).....	45
Scenario B: Uneven progress with overshoot (about 55 per cent)	45
Scenario C: Fracture and cascade (about 25 per cent).....	45
What separates the scenarios	46
21. Conclusions: Convergence vs. Crisis	47
The drivers of prosperity, resilience, and stability	47
Five priorities.....	47
22. Key Indicators to Watch This Century	49
How to read the dashboard	50
A note on this report	50

1. Executive Summary

Humanity enters the second half of the twenty-first century richer, healthier, and more connected than at any point in its history, and more exposed to compounding risk than at any point since the Cold War. Both statements are true at once, and the century will be decided by the race between them.

This report argues that the defining feature of the century is the simultaneous operation of two large, interacting dynamics. The first is **convergence**: the spread of income, health, education, and technology from the early industrial economies to the rest of the world. The second is **polycrisis**: the coupling of climate, ecological, financial, geopolitical, and technological risks so that a shock in one system propagates rapidly into the others. Convergence raises the ceiling on what humanity can achieve; polycrisis lowers the floor beneath it. The analytical question is whether the first can outpace the second.

Key findings

- **Power is rebalancing, not simply transferring.** The G7's share of world output at purchasing-power parity has fallen from roughly half in 1990 to under 30 per cent, while the BRICS-5 share has more than doubled to over a third ([IMF World Economic Outlook database](#)). The West remains the leader in frontier technology, finance, and alliances, but it no longer sets the terms alone.
- **Asia is the century's first half; Africa is its second.** Asia holds close to 60 per cent of humanity and roughly half of world output, but its population peaks in the 2050s at about 5.3 billion. Africa grows from 1.5 billion people to a projected 3.8 billion by 2100, roughly 37 per cent of the world ([UN World Population Prospects 2024](#)).
- **Population will peak within the lifetimes of most readers.** The UN's central projection has the world peaking near 10.3 billion in the mid-2080s; the IHME and Wittgenstein models peak earlier and lower, near 9.7 billion. Ageing, not growth, becomes the dominant demographic fact in every region except Sub-Saharan Africa.
- **Technology is the strongest force for convergence and the least predictable.** Solar electricity is about 90 per cent cheaper than in 2010 ([IRENA](#)); artificial intelligence exposes about 40 per cent of jobs worldwide to disruption ([IMF](#)). Whether either delivers broad prosperity depends on institutions, not on the technology.
- **The Earth system is the binding constraint.** The planet has already warmed about 1.4 °C; current policies point toward roughly 2.8 °C by 2100 ([UNEP Emissions Gap Report 2025](#)). Air pollution kills about 8 million people a year ([State of Global Air](#)); monitored wildlife populations have fallen by an average of 73 per cent since 1970 ([WWF Living Planet Report 2024](#)).
- **The interactions matter more than the individual risks.** Our interaction analysis finds that climate, geopolitics, and AI are the largest transmitters of stress, while debt and finance, resources, health, and governance are the largest receivers. Cascades, not isolated shocks, are the realistic failure mode.
- **Survivability risk is concentrated in a few tails.** Expert assessments of existential catastrophe this century range from a few per cent to about one in six, dominated by advanced AI, engineered pandemics, and nuclear war rather than by climate change alone ([Ord, *The Precipice*](#)).

Assessment: can convergence outpace systemic risk?

Our assessment is a qualified yes on the median path and a clear no on the tails. On the median path, convergence forces are strong enough that global income per person roughly doubles over the next half-century and poverty continues to fall, even with a temperature overshoot, because the cost of clean energy, the spread of education, and the demographic transition are largely self-reinforcing. On the tails, no amount of convergence protects against a major-power war, an engineered pandemic, or a cascade that destroys the institutions on which convergence depends. The practical conclusion is that the highest-value investments are those that serve both purposes at once: resilient infrastructure, early warning, distributed clean energy, health systems, and the institutional capacity to govern new technology.

Table 1. The century's major forces at a glance

Force	Direction through 2100	Net effect on convergence	Net effect on systemic risk
Rise of Asia	Share of world output rises to mid-century, then plateaus as populations age	Strongly positive	Mixed: concentration and flashpoint risk
Africa's demographic rise	Population grows from 1.5bn to 3.8bn	Positive if jobs and power arrive	Negative if they do not
Ageing and peak population	Peak near 2060 to 2085, then decline	Mixed	Fiscal and care strain
Technology and AI	Rapid diffusion, uneven benefits	Positive, institution-dependent	Rising: misuse and concentration
Clean-energy transition	Costs fall, investment doubles fossil	Strongly positive	Reduces climate and security risk
Climate change	Warming of about 2.5 to 3 °C on current path	Negative, regionally severe	Strongly rising
Pollution and ecosystems	Air quality improves in some regions; biodiversity still declining	Negative	Rising
Geopolitics	Multipolar and contested	Mixed	Rising: war and fragmentation

Direction and confidence are H Heuristics judgements based on the sources cited in the corresponding sections.

2. Introduction: The Defining Century

Every century is said to be decisive. This one has a stronger claim than most, because it is the first in which humanity's collective impact on the planet is large enough to threaten the stability of the systems on which its own progress depends, and the first in which the technological means to manage that threat are also within reach.

Three features distinguish the twenty-first century from its predecessors. First, population growth, which defined the last three hundred years, is ending. Humanity added roughly six billion people between 1950 and 2020; it will add perhaps two billion more and then, on most projections, begin to shrink ([UN DESA](#)). Second, the geography of economic dynamism is moving. For two centuries the industrial West set the pace; the most rapid growth in output, and increasingly in invention, now occurs in Asia, with Africa to follow. Third, the scale of human activity has become comparable to the scale of natural processes. The [planetary boundaries framework](#) assessed in 2023 that six of nine Earth-system boundaries had been transgressed ([Richardson et al., Science Advances](#)).

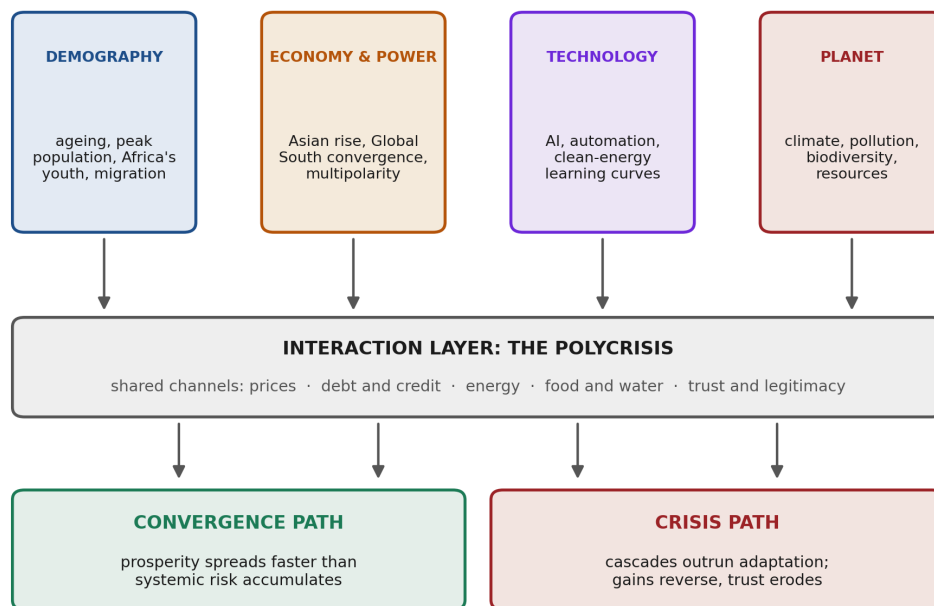
Two stories that are both true

Public discussion of the century tends to polarise into two stories. The optimistic account emphasises the extraordinary record of improvement: global life expectancy has risen from about 46 years in 1950 to about 73 today, extreme poverty has fallen from a majority condition to roughly one in ten people, and the cost of the technologies that matter most, from solar panels to genome sequencing, has fallen at rates with no historical precedent. The pessimistic account emphasises the accumulation of risk: 2024 was the first calendar year above 1.5 °C of warming ([Copernicus](#)); great-power rivalry has returned; and the last binding limit on the US and Russian nuclear arsenals, New START, expired in February 2026 ([Chatham House](#)).

Both accounts are accurate, and the discipline of this report is to hold them together. Progress and risk are not alternatives; they are produced by the same underlying process. The fossil-fuelled industrial expansion that lifted billions out of poverty is also the source of most of the warming. The connectivity that spreads knowledge also spreads disease and disinformation. The scale of the global economy that funds research also drives the extraction that degrades ecosystems. The question for the century is therefore not whether to be optimistic or pessimistic but whether the feedbacks that generate progress can be redirected faster than the feedbacks that generate risk.

The polycrisis lens

We use the term **polycrisis** in the sense developed by the Cascade Institute and popularised by the historian Adam Tooze: a cluster of related global risks with the potential to cause cascading, system-wide failure ([Cascade Institute, What Is a Global Polycrisis?](#)). The term is useful because it directs attention away from ranking individual threats and toward the couplings between them. The [World Economic Forum's Global Risks Report 2026](#) reflects the same shift, describing a risk landscape in which geoeconomic confrontation, extreme weather, misinformation, and technological risk are increasingly entangled.



The century's central question: which path the interaction layer selects

Figure 1. *The century as a collision of forces: four families of change pass through a shared interaction layer, and that layer selects between a convergence path and a crisis path.*

Source: H Heuristics conceptual schematic.

How this report is organised

Sections 3 to 8 examine the geopolitical, economic, and demographic reordering of the world: the rebalancing of power, the future of the West, the Asian century, Africa's demographic rise, convergence in the Global South, and the dynamics of population, ageing, and migration. Sections 9 to 13 examine the technological and planetary forces: AI and automation, energy and industry, climate, pollution and health, and biodiversity. Sections 14 to 17 turn to interaction and exposure: the polycrisis framework, geopolitics, cities and infrastructure, and survivability risk. Sections 18 to 22 are synthetic: sustainable development as risk mitigation, regional outlooks to 2100, three scenarios, conclusions, and a dashboard of indicators to watch.

3. The Great Rebalancing of Global Power

The central geopolitical fact of the century is not the decline of one power but the end of a long monopoly. For roughly two hundred years a small group of industrial economies accounted for most of world output, most of its innovation, and nearly all of its military capability. That concentration is dissolving.

The rebalancing is better understood as a return than an upheaval. According to the long-run estimates of the [Maddison Project](#), China and India together accounted for roughly half of world output as late as 1820. The industrial revolution, colonial extraction, and the unusual technological lead of Europe and North America compressed their share to a small fraction by the mid-twentieth century. What is happening now is a reversion toward the demographic distribution of the world's people, which has always been concentrated in Asia.

The shape of the shift

Measured at purchasing-power parity, which best reflects real production and consumption, the G7's share of world output has fallen from about half in 1990 to under 30 per cent in 2024 (Figure 2). Over the same period the combined share of Brazil, Russia, India, China, and South Africa has risen from about 15 per cent to over a third, with the crossover occurring around 2020. At market exchange rates the picture is less dramatic, because the United States remains close to a quarter of world output and its currency, markets, and financial institutions retain structural advantages. The distinction matters: the world is multipolar in production before it is multipolar in finance.

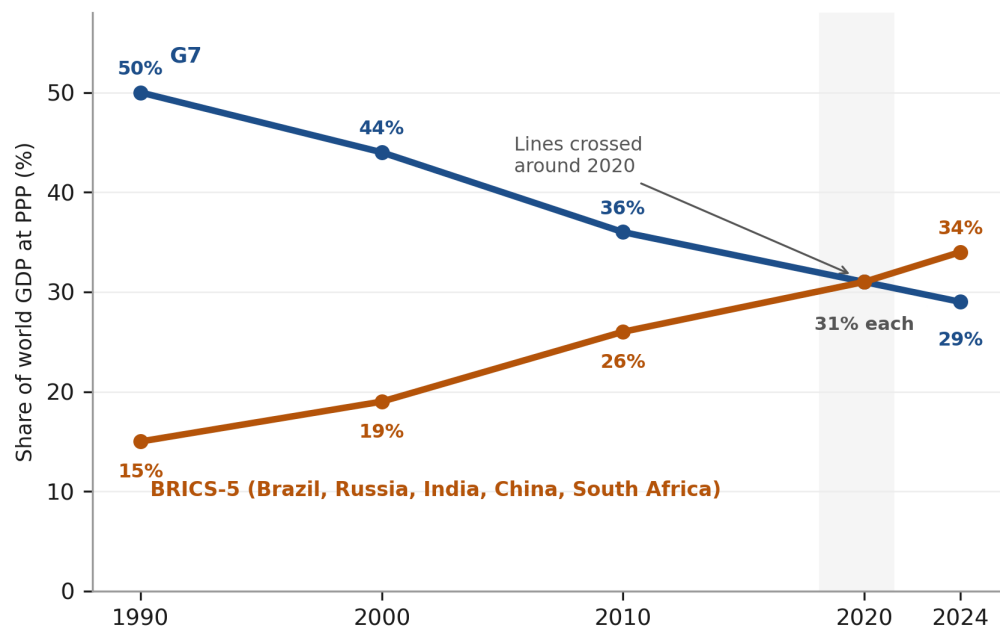


Figure 2. Shares of world GDP at purchasing-power parity, G7 and BRICS-5, 1990 to 2024 (approximate).

Source: H Heuristics, rounded from IMF World Economic Outlook database PPP weights.

What rebalancing does and does not mean

Three qualifications prevent a simple narrative of Western decline. First, the economic rise of a country is not equivalent to a rise in its capacity to shape the system. China manufactures roughly 30 per cent of the world's industrial output and dominates the supply chains for solar panels, batteries, and processed critical minerals ([IEA, *Solar PV Global Supply Chains*](#); [IEA, *Global Critical Minerals Outlook 2025*](#)), yet it remains dependent on foreign markets, imported energy, and Western-controlled financial plumbing. Second, the rise of the rest is not a single bloc. India, China, Russia, Brazil, Indonesia, and the Gulf states have divergent interests, and the label BRICS describes an aspiration to a multipolar order more than a coordinated policy. Third, structural shifts do not produce stability automatically. Power transitions have historically been among the most dangerous periods in international relations, because rising and established powers disagree about the rules.

The dimensions of power

Table 2. Dimensions of power: where the balance is shifting, and where it is not

Dimension	Current balance	Direction	Key uncertainty
Production and trade	Asia-centred; China the largest manufacturer	Further shift to Asia, then Africa	Tariffs and supply-chain decoupling
Finance and currency	Dollar-centred; Western institutions dominant	Slow diversification	Sanctions backlash; digital payments
Frontier technology	US leads in AI frontier models; China close in applications	Contested duopoly	Chip export controls; talent flows
Military	US leads globally; China expanding regionally	Narrowing gap in Asia-Pacific	Escalation; nuclear arms control
Energy and minerals	Fossil exporters yielding to clean-tech manufacturers	Shift to processing powers	Chokepoint export controls
Norms and institutions	Western-designed, increasingly contested	Fragmentation	Reform of the IMF, UN Security Council

Qualitative H Heuristics assessment. Direction refers to the next two to three decades.

The practical consequence is that the system is moving from a hierarchy to a network of overlapping dependencies. Weaponised interdependence, in which control over a chokepoint such as advanced semiconductors, rare-earth processing, or dollar clearing is used as a tool of statecraft, has become the characteristic form of great-power competition ([CSIS](#)). This shapes the risk picture analysed in Sections 14 and 15: a multipolar world can be stable, but only if its great powers build the institutions and habits that the unipolar and bipolar worlds supplied by default.

4. The Future of the Western World

The West is not in terminal decline, but it faces a specific set of structural constraints, demographic ageing, fiscal strain, slowing productivity, and political polarisation, that make renewal a matter of choice rather than inertia.

By "the West" we mean the advanced democracies of North America, Europe, and the Asia-Pacific allies: roughly 1.1 billion people, or about one in seven of the world's population, producing about 40 per cent of world output at PPP and well over half at market exchange rates. This group has no single trajectory. The United States combines the world's strongest innovation ecosystem with large fiscal deficits and growing political division; the European Union has strong institutions and social cohesion but weak growth and an ageing workforce; Japan and South Korea have the most advanced demographic ageing in history.

Demography is the first constraint

Across the advanced economies fertility is below replacement, and in many it is far below. South Korea's total fertility rate is about 0.75, Japan's and Italy's about 1.2, and the EU average about 1.4, against a replacement level of 2.1 (Figure 6, Section 8). The working-age population of the EU is projected to shrink by roughly an eighth by 2050, Japan's by about a quarter, and South Korea's by more than a third (Figure 7). The United States is the outlier, with a modest increase sustained largely by immigration. Fewer workers per retiree raises pension and health spending, depresses the tax base, and slows aggregate growth unless productivity accelerates ([OECD](#)).

Productivity and the innovation advantage

The West's strongest card is innovation. Most frontier AI models, much of the world's venture capital, the leading universities, and the deepest capital markets remain concentrated in the United States and its allies. The [Draghi report on European competitiveness](#) argued that the European Union needs additional investment on the order of 750 to 800 billion euros a year to restore its productivity trajectory, and that its comparative weakness lies in translating research into scaled firms rather than in research itself. The AI wave is both the largest opportunity and the largest test: if generative AI delivers sustained productivity gains, the West's demographic headwinds can be partly offset; if its benefits are captured elsewhere, the West's relative position will erode faster.

Fiscal and political strain

Public debt in the advanced economies stands near or above 100 per cent of GDP in the United States, France, the United Kingdom, Italy, and Japan, and interest costs have risen sharply since 2022. Ageing will push spending higher through mid-century. At the same time, political polarisation, declining trust in institutions, and the electoral appeal of nationalist and protectionist platforms complicate the long-horizon investment decisions the transition requires. The risk is not that the West loses its capacity to act, but that it loses the consensus required to act at the scale and speed the period demands.

Table 3. The West: structural strengths and vulnerabilities

Strengths	Vulnerabilities
Deepest capital markets and the dominant reserve currency	Ageing workforce and rising dependency ratios
Frontier research universities and AI leadership	High public debt and rising interest costs
Alliance networks and military technology	Political polarisation and declining institutional trust
Capacity to attract global talent (especially the US)	Immigration politics limiting that capacity
Rule-of-law and property-rights institutions	Slow permitting and under-investment in infrastructure

H Heuristics assessment.

Three possible paths

The West's future is best treated as a choice among three paths. In the first, **managed renewal**, productivity growth from AI and clean-energy investment, selective immigration, and fiscal reform stabilise relative position at a smaller but still leading share of world output. In the second, **gradual drift**, ageing and polarisation produce slower growth and diminishing influence without crisis. In the third, **fracture**, internal political conflict or a fiscal shock undermines the capacity to lead, with consequences that propagate globally because the Western financial system remains the system's core. Our most-likely scenario in Section 20 is drift with episodes of renewal: a West that remains rich, technologically advanced, and influential, but no longer dominant.

5. The Asian Century

Asia is where most of humanity lives, where most of the world's manufacturing happens, and where a rising share of its technology is invented. It is also where the demographic dividend is closing fastest. The Asian century is real, but it may prove to be closer to an Asian half-century.

Asia is home to about 4.8 billion people, close to 60 per cent of the world total, and produces roughly half of world output at PPP. China has become the world's largest manufacturer and trader; India is the fastest-growing major economy and since 2023 the most populous country; Indonesia, Vietnam, the Philippines, and Bangladesh are consolidating as middle-income manufacturing and service economies. Brookings estimates, in work by Homi Kharas, suggest that Asia will account for roughly two-thirds of the global middle class by 2030 ([Brookings](#)).

The demographic arc

Asia's rise rested on a demographic dividend: a large working-age population with few dependants, high savings, and rapid urbanisation. That dividend is now ending in the north and east. China's population has been shrinking since 2022; the UN's central projection has it falling from about 1.4 billion to roughly 630 million by 2100. India overtook China in 2023 and is projected to peak near 1.7 billion in the 2060s. Nigeria, by contrast, is projected to grow from about 230 million to roughly 480 million by 2100 (Figure 3). The Asian total peaks at about 5.3 billion in the 2050s and then declines to roughly 4.6 billion by 2100 ([UN WPP 2024](#)).

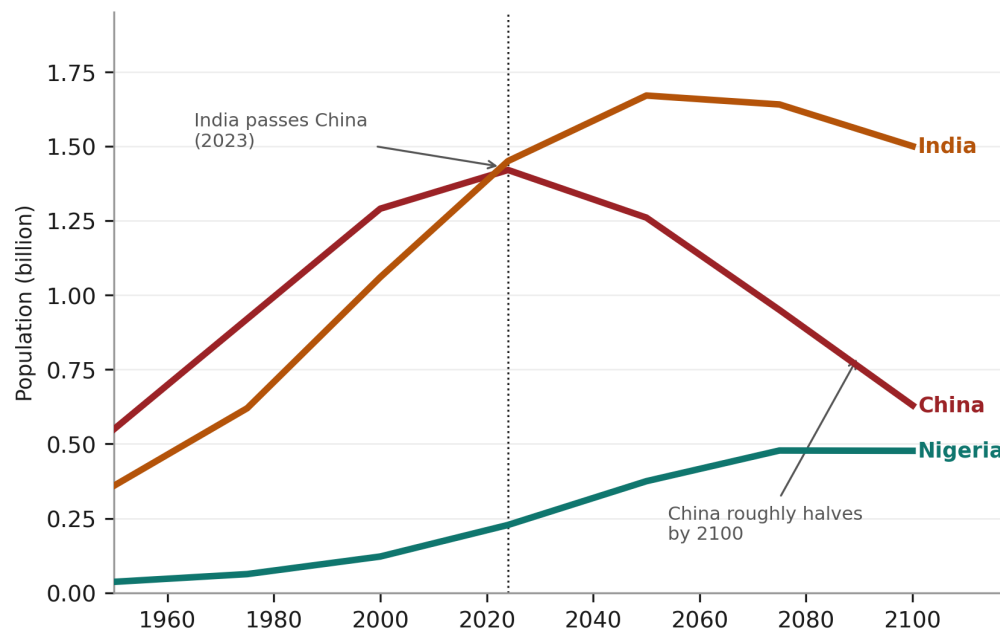


Figure 3. Population of China, India, and Nigeria, 1950 to 2100 (UN medium variant, approximate).

Source: H Heuristics, rounded from UN World Population Prospects 2024.

Sources of strength

Asian economies have three durable advantages. The first is **industrial depth**: dense supply chains in electronics, batteries, solar, and machinery produce cost advantages that are hard to replicate. The second is **investment in human capital and infrastructure**: Asian governments have sustained high rates of investment in education, ports, power, and digital networks. The third is **adaptive policy**: from Japan's postwar model to the developmental states of Korea, Taiwan, and Singapore and China's reforms, East Asian governments have repeatedly shown the ability to shift strategy as conditions change. India is now attempting the same transition with a distinctive emphasis on digital public infrastructure, including its identity, payments, and data-exchange systems ([CSIS](#)).

Sources of vulnerability

Asia's vulnerabilities are equally clear. **Ageing**: Japan, South Korea, China, and Thailand will age before they become rich by Western standards, a pattern sometimes described as "getting old before getting rich." **Climate exposure**: Asia contains most of the world's people living in low-lying coastal zones, the large river deltas of Bangladesh, Vietnam, and China, and cities where heat stress already constrains outdoor work ([ILO](#)). **Concentration risk**: the density of Asian supply chains, and the region's flashpoints in the Taiwan Strait, the Korean peninsula, the South China Sea, and the India-Pakistan and India-China borders, make it simultaneously the engine of the world economy and its most consequential geopolitical risk. **Debt**: China's property sector and local-government debt continue to constrain domestic demand.

An Asian half-century

Taken together, these forces suggest that Asia's share of world output will continue to rise through roughly the 2040s, driven by India and South-East Asia as China matures, and then plateau as populations peak and age. After mid-century the engine of marginal growth in the working-age population shifts to Sub-Saharan Africa. Asia will remain the world's largest economic region throughout the century, but its relative gains will be largest in the next twenty-five years. The Asian century is therefore best understood as the first act in a longer reordering, one that Section 6 and Section 7 take up.

6. Africa's Demographic Rise

Africa is the only major region whose population will keep growing at scale through the end of the century. By 2100 roughly one in three people alive will be African. Whether that is a dividend or a burden is the most consequential open question in the demographic outlook.

Africa's population stood at about 1.5 billion in 2024. The UN's central projection has it reaching about 2.5 billion by 2050, when one in four people on Earth will be African, and about 3.8 billion by 2100, around 37 per cent of humanity ([UN WPP 2024](#)). Nigeria, the Democratic Republic of the Congo, Ethiopia, Egypt, and Tanzania together account for a majority of the growth. The median age on the continent is about 19, compared with about 42 in Europe and 32 in Asia. The structure is a pyramid with a wide base, and it will still be young in 2060 when most of the rest of the world is old.

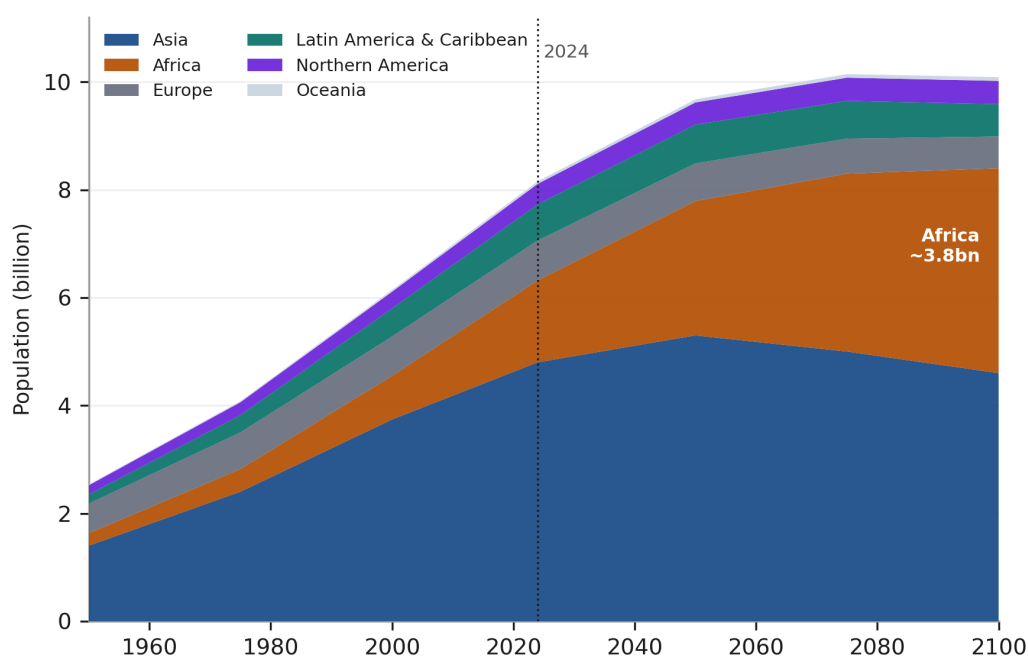


Figure 4. World population by region, 1950 to 2100 (UN medium variant, approximate). Africa's share rises from about 18 per cent today to about 37 per cent by 2100.

Source: H Heuristics, rounded from UN World Population Prospects 2024.

The dividend is conditional

A demographic dividend occurs when the share of working-age people rises relative to dependants and the economy can employ them productively. East Asia's dividend between 1970 and 2010 is the template. Africa's fertility decline has been slower than that of Asia: Sub-Saharan fertility remains around 4.3 births per woman, against 1.9 in India, and the pace of its decline is the single largest source of uncertainty in the global population projection. Even more important is what the working-age bulge finds to do. Roughly 10 to 12 million young Africans enter the labour force each year, while the formal sector creates only a fraction as many jobs ([World Bank, Africa's Pulse](#)). Learning outcomes are the second constraint: the majority of

ten-year-olds in low- and middle-income countries cannot read a simple text, and the proportion in Sub-Saharan Africa is higher still ([World Bank](#)).

The enabling conditions

- **Power.** About 565 million people in Sub-Saharan Africa still lack electricity, 85 per cent of the global access deficit ([Tracking SDG7 2025](#)). The continent holds some of the best solar resources on Earth but receives about 2 per cent of global clean-energy investment ([IEA](#)). The World Bank and African Development Bank's [Mission 300](#) aims to connect 300 million people by 2030, with distributed solar and mini-grids carrying much of the load.
- **Trade and markets.** The African Continental Free Trade Area, covering about 1.3 billion people, could expand intra-African trade and lift tens of millions out of extreme poverty if its rules of origin and logistics are implemented ([World Bank](#)).
- **Cities.** Africa is urbanising faster than any region in history, adding tens of millions of urban residents each year. Where cities concentrate firms and workers, productivity rises; where they grow without infrastructure, they become dense poverty ([World Bank, Africa's Cities](#)).
- **Fiscal space.** Many African governments spend more on debt interest than on health or education, and borrow at spreads that no infrastructure project can reliably clear ([UNCTAD, A World of Debt](#)).

Africa and the world

The continent's demographic rise has global consequences beyond its own prosperity. By mid-century Africa will contain the majority of the world's new entrants to the labour market at a time when the rest of the world has too few. This creates a plausible complementarity: ageing economies need workers, and young economies need jobs. It also creates a potential tension, because migration is politically contested and because the quality of governance determines whether young populations become sources of innovation or instability. Africa's climate vulnerability, concentrated in the Sahel, the Horn, and the southern African drylands, will interact with population growth to increase pressure on food and water systems (Section 14).

The reasonable conclusion is that Africa's century is a possibility, not a forecast. The enabling investments, in power, schools, cities, and trade, are known and increasingly affordable. They are also, in aggregate, the most important development investment of the next half-century, because the cost of failure is borne by the whole world.

7. Convergence and the Global South

Economic convergence, the tendency of poorer countries to grow faster than richer ones, is the oldest promise of development economics. It has been honoured often enough to reshape the world and broken often enough to prevent complacency.

Since 1990 the emerging and developing world has moved from about two-fifths to about three-fifths of the world economy at PPP, and the number of people living in extreme poverty has fallen by well over a billion. Yet convergence has been highly uneven. East and South Asia have converged rapidly; most of Sub-Saharan Africa, parts of Latin America, and parts of the Middle East have not. The [World Bank's World Development Report 2024](#) finds that only 34 middle-income economies have transitioned to high-income status since 1990, a third of them through European Union accession or oil discoveries rather than domestic transformation. More than 100 economies are now middle-income, and many face what the report calls the middle-income trap.

The arithmetic of catching up

Convergence is mathematically demanding. A country starting at 10 per cent of frontier income and growing one percentage point faster than the frontier every year would reach only about 21 per cent of frontier income in 75 years; at a growth advantage of two points it reaches about 44 per cent; at three points about 92 per cent (Figure 5). The East Asian miracle economies sustained gaps of three to five points for decades, which is exceptional. The implication is that moderate performance, which would be considered good in the advanced world, is insufficient to close a gap within a lifetime.

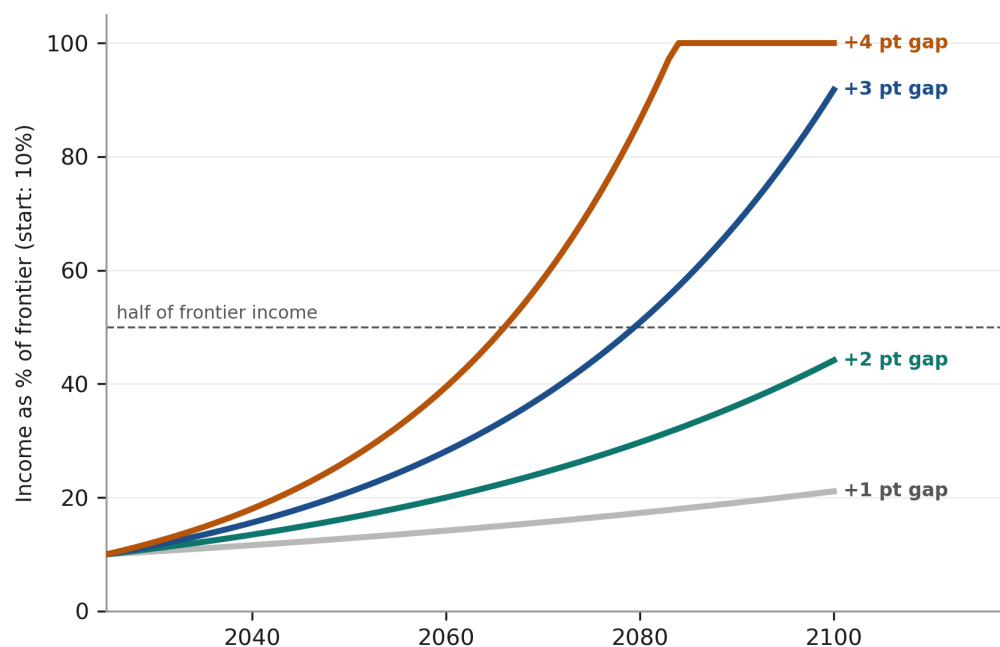


Figure 5. Convergence arithmetic: income relative to the frontier over 75 years for a country starting at 10 per cent, by annual growth advantage.

Source: H Heuristics calculation. Illustrative compound-growth arithmetic, not a forecast.

Why the old path is narrower

The classic route to convergence was export-led industrialisation: move workers from farms to factories and export manufactured goods. Dani Rodrik has shown that manufacturing productivity converges unconditionally toward the frontier ([Rodrik, *Quarterly Journal of Economics*](#)), but also that the share of manufacturing in employment now peaks at lower levels of income, a phenomenon he calls premature deindustrialisation ([Rodrik](#)). Automation, Chinese scale, and rising trade barriers narrow the ladder further. Late industrialisers must therefore find paths that combine light manufacturing, tradable services, agriculture, and clean-energy supply chains rather than replicate the Korean model.

The Global South's three constraints

- **Capital.** The cost of capital for solar projects in emerging and developing economies is two to three times that in advanced economies, which makes clean energy the cheapest source of power but the most expensive to finance ([IEA, *Reducing the Cost of Capital*](#)). Developing countries paid a record US\$1.4 trillion in foreign debt service in 2023 ([World Bank](#)).
- **Climate shocks.** Adaptation needs in developing countries are estimated at US\$310 to 365 billion a year by 2035, against roughly US\$26 billion of international public flows ([UNEP *Adaptation Gap Report 2025*](#)).
- **Capability.** The gap in state capacity, from tax collection to regulation to project delivery, determines how effectively resources convert into growth. Digital public infrastructure is the most promising shortcut: countries such as India, Brazil, and Rwanda have used identity, payment, and data-exchange systems to leapfrog legacy systems ([UNDP](#)).

Opportunities for leapfrogging

The Global South can also benefit from latecomer advantages. Solar and batteries allow countries to build power systems without the legacy of centralised fossil grids. Mobile money and digital identity have extended finance to hundreds of millions who never had bank accounts ([World Bank *Global Findex 2025*](#)). Cheap Chinese electric vehicles, e-bikes, and solar panels are being adopted across Africa, South Asia, and Latin America at rates that policy alone would not have produced. South-South trade now accounts for about a quarter of world merchandise trade, giving the developing world a degree of independence from Western demand. Whether these advantages compound into sustained convergence depends on whether governments can convert technology adoption into jobs and on whether the external financial environment stabilises.

8. Population, Aging, and Migration

For the first time in modern history, the question is not how fast population will grow but when it will peak, how far it will fall, and how societies that are old, small, or both will sustain prosperity.

The 2024 revision of the UN's World Population Prospects projects a global peak of about 10.3 billion in the mid-2080s, followed by a slow decline to about 10.2 billion in 2100 ([UN DESA](#)). The global fertility rate stood at about 2.25 in 2024, just above replacement, but with enormous dispersion. Sixty-three countries and areas have already passed their peak, including China, Japan, Germany, and Russia. Other models are more pessimistic: the IHME's reference projection, published in the [Lancet](#), peaks near 9.7 billion around 2064 and falls to about 8.8 billion by 2100, and more recent economist-led analyses suggest that global fertility may already be below replacement. The difference between those paths, about 1.5 billion people by 2100, is roughly the size of today's Africa.

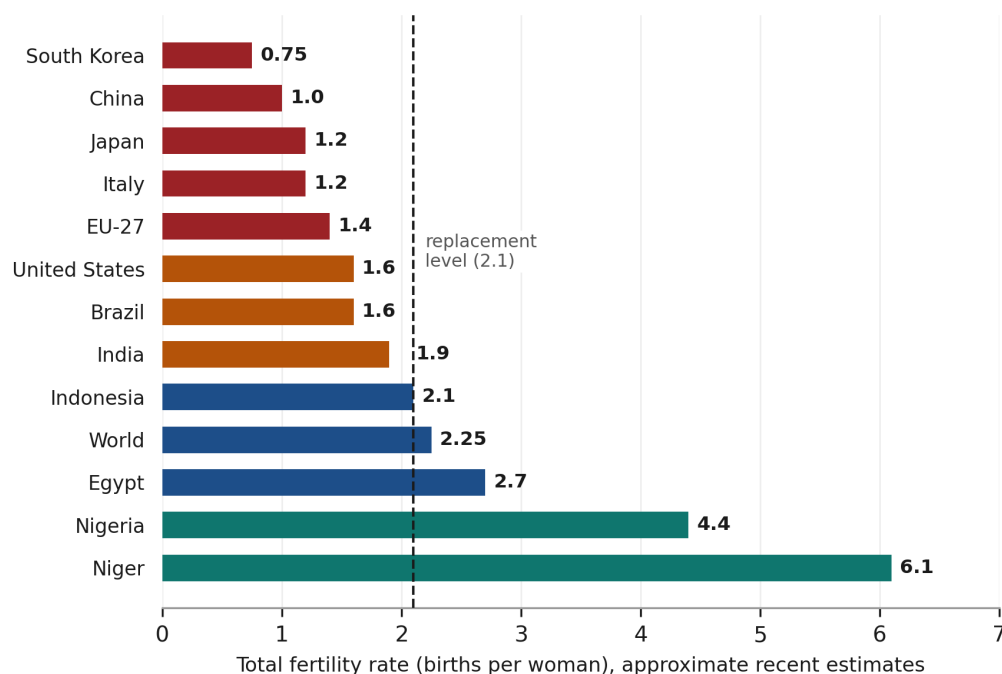


Figure 6. Total fertility rate in selected countries and the world (approximate recent estimates).

Source: H Heuristics, rounded from UN World Population Prospects 2024 and national statistics.

Ageing is the dominant fact

Whichever projection is closer, ageing is certain. The share of the world's population aged 65 and over is about 10 per cent today and is projected to reach roughly 16 per cent by 2050; by the late 2070s people over 65 will outnumber children under 18 for the first time in human history. The working-age population, which sustains production and tax revenue, will fall by roughly a fifth in China, a quarter in Japan, and more than a third in South Korea between 2025 and 2050, while it grows by 60 to 70 per cent in Ethiopia and Nigeria (Figure 7). The OECD has warned that pension systems in most member countries face rising pressure as a result ([OECD](#)).

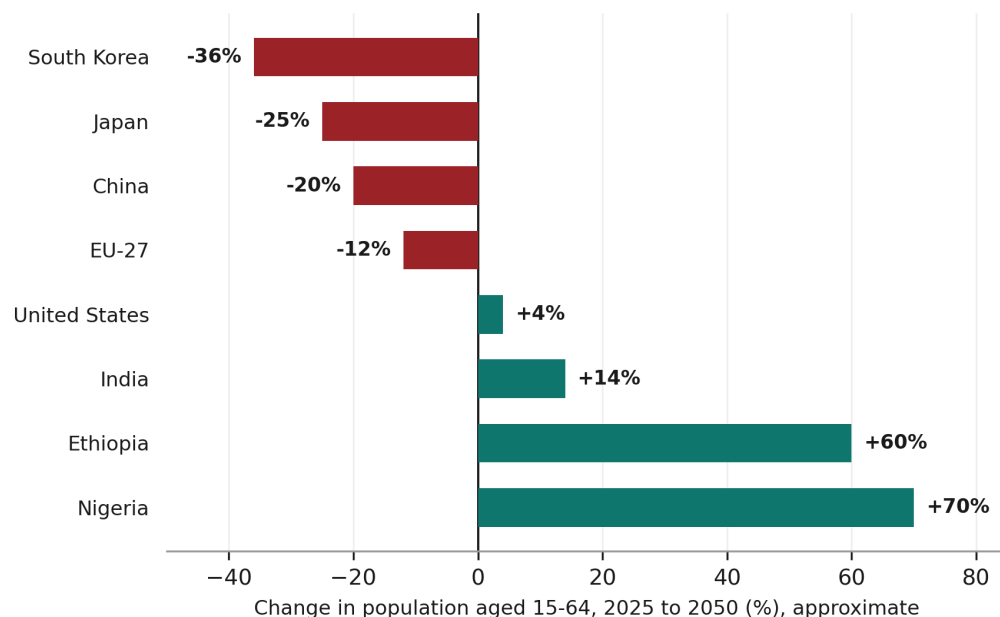


Figure 7. *Change in the population aged 15 to 64 between 2025 and 2050, selected countries (approximate).*

Source: H Heuristics, rounded from UN World Population Prospects 2024, medium variant.

Ageing does not mean decline in the conventional sense. Per-capita income can rise as population falls, and an ageing society can adapt through later retirement, higher female and older-worker participation, automation, and higher capital per worker. But the adjustment is difficult, and countries that age quickly, before they have built both wealth and institutions, face the hardest trade-offs. The central policy lesson of the East Asian ageing experience is that fertility incentives have limited power, while productivity, participation, and migration have more.

Migration as the balancing mechanism

The geography of demographic imbalance creates a logic for migration. There were about 304 million international migrants in 2024, around 3.7 per cent of the world's people ([UN DESA](#)). Remittances to low- and middle-income countries now exceed both foreign direct investment and official development assistance to those countries. Rich countries with declining workforces and young countries with surplus labour are natural partners, and the largest net contribution of migration to growth has been in the United States, Canada, the Gulf states, and Western Europe.

Pressure is also rising from other directions. More than 115 million people are forcibly displaced by conflict and persecution ([UNHCR](#)), and the World Bank's *Groundswell* analysis projects that climate impacts could force up to 216 million people to move within their own countries by 2050 under pessimistic scenarios ([World Bank](#)). Most of that movement will be internal, from drought-stricken farms to cities and from coastal edges to higher ground, rather than across borders. The political economy of migration is thus the pivotal friction in the demographic picture: the economic case for managed immigration is strong, but the political tolerance for it is decreasing in many of the countries that need it most. How that tension is resolved will help determine whether the West's ageing is managed or merely endured.

9. Technology, AI, and Automation

Artificial intelligence is the most powerful general-purpose technology to emerge since electricity, and the one whose economic and political effects are least understood. For the Global South, it is simultaneously a leapfrogging opportunity and a threat to the traditional development ladder.

The pace of capability gain has been extraordinary. The Stanford [AI Index 2026](#) documents rapid improvement on coding, mathematics, and scientific reasoning benchmarks, adoption of generative AI faster than that of the personal computer or the internet, and a US-China frontier gap that has narrowed to near parity on many measures. Industry now produces the overwhelming majority of frontier models, and investment in AI infrastructure has become a macroeconomic force: the IMF attributes a substantial part of the upgrade to 2026 global growth to AI-related investment ([IMF, World Economic Outlook Update, January 2026](#)).

The productivity question

Estimates of AI's long-run economic effect vary by an order of magnitude. At the sceptical end, Daron Acemoglu estimates a total-factor-productivity gain of less than one per cent over a decade, because only a fraction of tasks can be profitably automated ([Acemoglu, NBER](#)). At the optimistic end, Goldman Sachs estimated that generative AI could raise global GDP by about 7 per cent over ten years ([Goldman Sachs](#)). The truth depends on the speed of diffusion beyond the technology sector, the extent to which AI complements rather than replaces workers, and the emergence of new tasks and industries. We treat the range as the relevant uncertainty and note that even the lower estimates imply a meaningful contribution given the scale of the global economy.

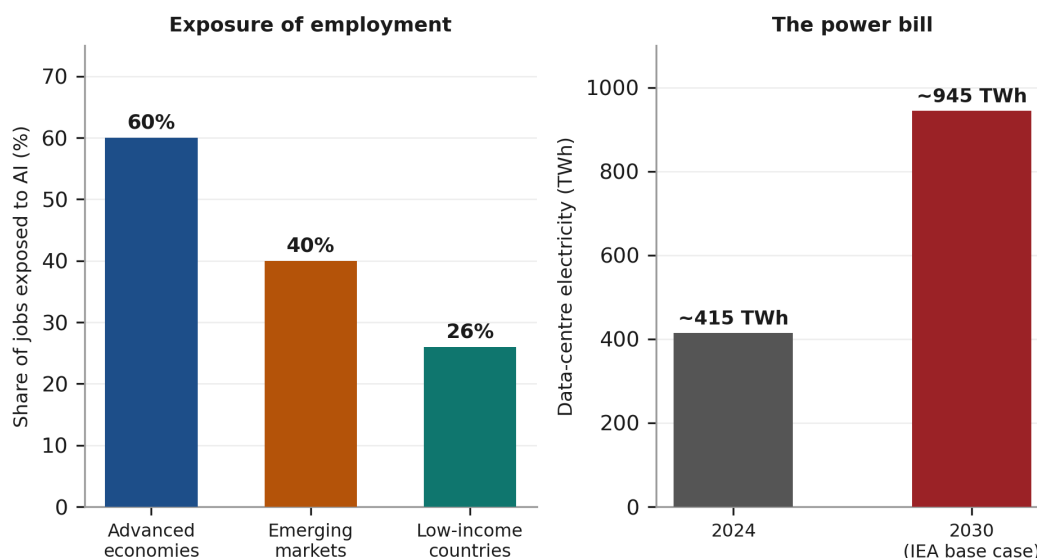


Figure 8. AI exposure and the power it requires. Left: share of jobs exposed to AI by income group (IMF). Right: global data-centre electricity demand, 2024 and the IEA 2030 base case.

Sources: IMF (2024) and IEA, Energy and AI (2025). Approximate.

Jobs, inequality, and the development ladder

The [IMF's analysis](#) finds that about 40 per cent of jobs worldwide are exposed to AI, rising to 60 per cent in advanced economies and falling to about 26 per cent in low-income countries. Exposure means both risk and opportunity: in advanced economies roughly half of exposed jobs may benefit from complementarity, while the rest face displacement. Low-income countries are less exposed in the short run but are also less able to benefit, because they have less digital infrastructure and fewer skilled workers. The risk for the Global South is concentrated in business-process outsourcing, call centres, and routine services, which have been a stepping stone for India, the Philippines, and Kenya. About 2.2 billion people remain offline ([ITU](#)), and GSMA warns of an emerging AI divide ([GSMA](#)).

The opportunity is equally real. AI tutoring, agricultural advisory, health diagnostics, and translation can deliver services at very low marginal cost to populations that have never had access to them. Drone delivery of medical supplies in Africa has grown to millions of deliveries ([AI for Cause](#)). The key is that these benefits do not arrive automatically; they depend on connectivity, local-language models, and public investment in adoption.

Concentration, energy, and governance

Three structural risks run through the AI transition. **Concentration:** compute, data, and talent are concentrated in a handful of firms and two countries, producing the potential for dependency and rent extraction. **Energy:** the IEA projects that data-centre electricity demand will more than double from about 415 terawatt-hours in 2024 to about 945 in 2030, roughly the current electricity consumption of Japan ([IEA, Energy and AI](#)). **Governance:** regulatory approaches diverge, from the EU's binding AI Act to a lighter-touch United States, while the [International AI Safety Report](#) documents growing concern about misuse, loss of control, and systemic effects. Section 17 treats advanced AI as one of the dominant sources of tail risk; here the point is that governance capacity, not technical capability, is the bottleneck on whether AI strengthens or weakens the convergence path.

10. Energy, Resources, and Industrial Transformation

The cost of clean energy has fallen so far, so fast, that the energy transition is no longer primarily a question of technology or even of climate policy. It is a question of industrial strategy, finance, and speed.

Global energy investment reached about US\$3.3 trillion in 2025, of which roughly US\$2.2 trillion went to clean energy and US\$1.1 trillion to fossil fuels ([IEA, World Energy Investment 2025](#)). Solar PV is now the cheapest source of new electricity in most of the world: its global weighted-average cost fell from about 46 cents per kilowatt-hour in 2010 to about 4 cents in 2024, a decline of about 90 per cent (Figure 9; [IRENA](#)). Lithium-ion battery pack prices have fallen to about US\$108 per kilowatt-hour ([BloombergNEF](#)). Solar and wind together supplied about 15 per cent of global electricity in 2024, and clean sources supplied over 40 per cent ([Ember](#)).

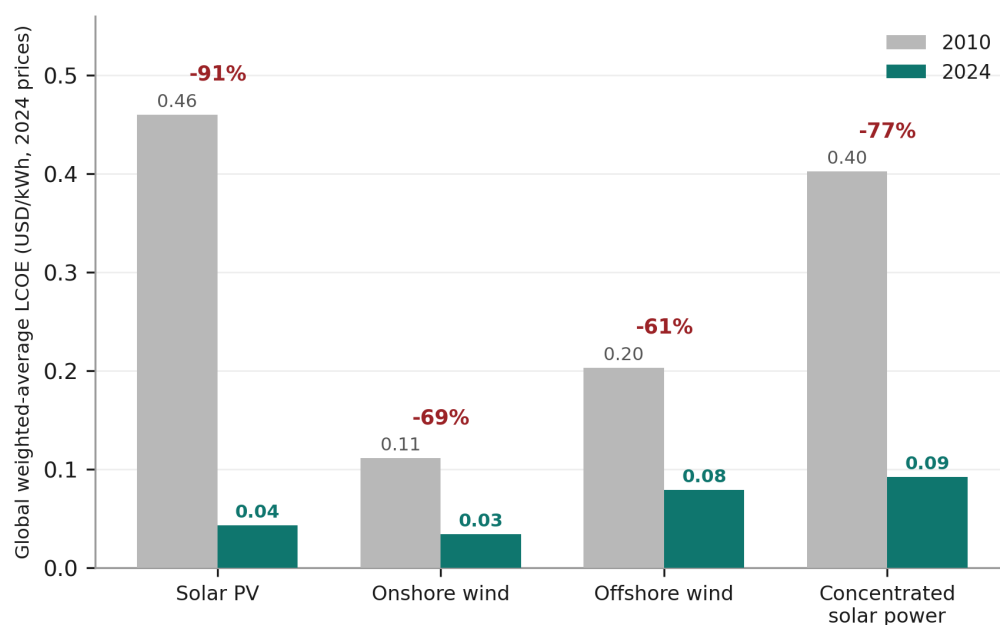


Figure 9. Global weighted-average levelised cost of electricity, 2010 and 2024, selected technologies (USD per kWh, 2024 prices).

Source: IRENA, Renewable Power Generation Costs in 2024; H Heuristics rounding.

Why the transition is still not fast enough

Despite those gains, fossil fuels still supply about four-fifths of the world's primary energy ([Energy Institute](#)), and global fossil CO₂ emissions reached another record in 2025 ([Global Carbon Project](#)). Three constraints explain the gap. First, **finance**: clean energy is capital-intensive, and financing costs in the developing world are two to three times those in advanced economies. Second, **systems integration**: grids, storage, and permitting have not kept pace with generation, and interconnection queues in many countries are measured in years. Third, **hard-to-abate sectors**: steel, cement, chemicals, shipping, and aviation lack cheap, scaled substitutes and account for a large share of remaining emissions.

Minerals, supply chains, and the new geography of energy

A clean-energy system substitutes mineral inputs for fuel inputs. It needs lithium, nickel, cobalt, graphite, copper, and rare earths in large volumes, and processing is concentrated: the top three refining countries control more than 80 per cent of supply for most key minerals ([IEA, *Global Critical Minerals Outlook 2025*](#)). Petroleum has chokepoints in straits; clean energy has chokepoints in refineries. This changes the geography of energy security. Countries with abundant sun, wind, and minerals, among them Chile, Morocco, Indonesia, the Gulf states, and Australia, gain strategic weight, while importers of fuel become less dependent on volatile commodity markets.

Industrial transformation and the Global South

The transition is also an industrial opportunity. Countries that can integrate cheap clean power with heavy industry, producing green steel, ammonia, and aluminium where energy is cheapest, can capture value that previously accrued to fossil exporters and to late-industrialising manufacturers elsewhere. Distributed solar and storage are extending electricity to the 666 million people who still lack it, as well as cooling and clean cooking ([Tracking SDG7](#)); [cooling demand](#) alone is projected to triple by 2050 and is one of the fastest-growing sources of electricity demand. The key insight for the century is that clean energy is now the default growth technology for emerging economies, not a concession to climate policy, and that the main obstacle is the cost and availability of capital.

Food, water, and land

Resource constraints are not only about energy and minerals. About 673 million people were undernourished in 2024 ([FAO, SOFI](#)), and roughly one in four people lives in a country facing extremely high water stress ([WRI Aqueduct](#)). Agriculture uses most of the world's freshwater withdrawals and is the main driver of land-system change, so food, water, and ecosystem pressures are tightly coupled to climate and to each other. The most promising responses combine yield gains in low-productivity regions, cold-chain and storage investment to cut post-harvest losses ([FAO](#)), irrigation efficiency, and dietary change in high-consumption regions. As Section 14 shows, food and water shocks are among the most important channels through which climate and conflict risks reach households.

11. Climate Change and Adaptation

Climate change is the century's best-documented systemic risk and the one for which the range of outcomes is most clearly a function of human choices. The difference between a manageable and an unmanageable climate is a difference of one to two degrees.

The planet has already warmed about 1.4 °C above the pre-industrial average. 2024 was the first calendar year above 1.5 °C by most datasets ([Copernicus](#)), and the WMO reports that 2025 was among the second- or third-warmest years on record, with the eleven warmest years all falling in 2015-2025 ([WMO](#)). WMO's Secretary-General has said that it is virtually impossible to avoid at least a temporary overshoot of 1.5 °C in the coming years, though returning below it by the end of the century remains possible. Emissions policy has bent the curve: warming expected by 2100 has fallen from about 4 °C a decade ago to about 2.8 °C under current policies and 2.3 to 2.5 °C if new national pledges are fully implemented ([UNEP Emissions Gap Report 2025](#)).

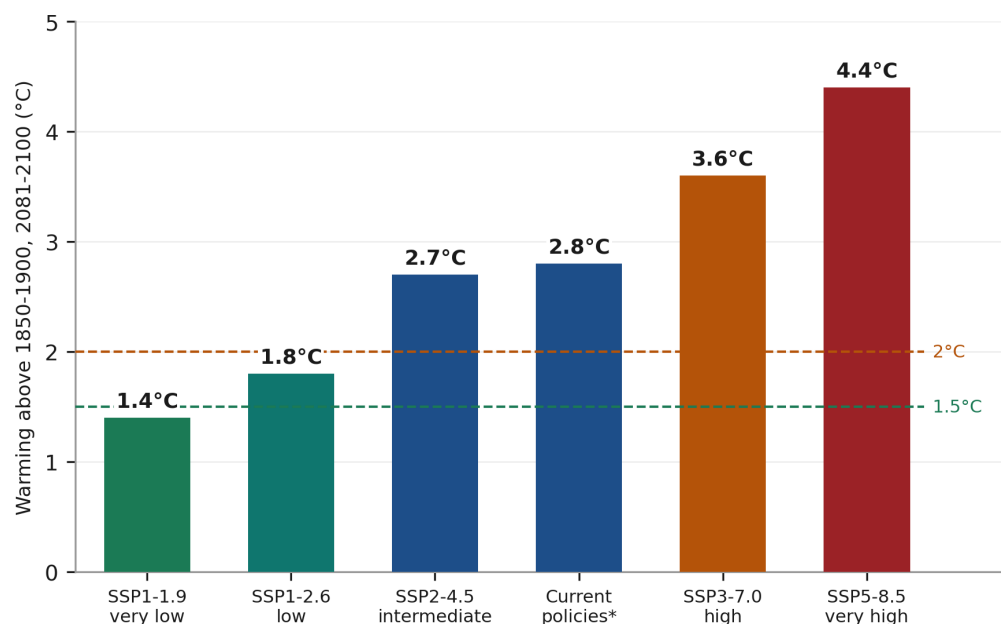


Figure 10. Projected warming by 2081 to 2100 under IPCC scenarios and current policies.

Sources: IPCC AR6 (SSP central estimates); UNEP Emissions Gap Report 2025 (*current policies).

Impacts: economic, human, and Earth-system

The economic effects of warming are larger than early models suggested. A study in *Nature* estimates that the world economy is already committed to a 19 per cent reduction in income by 2049 relative to a no-warming baseline, with the largest losses in low-latitude, low-income regions ([Kotz et al., Nature](#)); earlier work established that economic productivity peaks at moderate temperatures and falls sharply above them ([Burke, Hsiang, and Miguel, Nature](#)). The human toll is rising: the [Lancet Countdown](#) reports that heat-related deaths have risen to more than half a million a year and that heat exposure cost hundreds of billions of potential labour hours in 2024. Sea-level rise of about 0.3 to 1 metre by 2100 is likely under IPCC scenarios, with higher outcomes possible if ice sheets destabilise ([IPCC AR6](#)).

The deepest uncertainty concerns tipping points. [Armstrong McKay and colleagues](#) assessed that five tipping elements, including the Greenland and West Antarctic ice sheets and tropical coral reefs, may already be within their threshold range at current warming. The [Global Tipping Points report](#) concludes that warm-water coral reefs have probably already passed their tipping point. The Atlantic overturning circulation, Amazon dieback, and permafrost carbon release are lower-probability, higher-consequence concerns whose interaction with other risks we discuss in Section 14.

Adaptation: the necessary complement

Even in the best case, substantial warming is locked in and adaptation is unavoidable. The [UNEP Adaptation Gap Report 2025](#) estimates developing-country adaptation needs of US\$310 to 365 billion a year by 2035, against about US\$26 billion of international public finance. The returns are high: multi-hazard early-warning systems have been estimated to yield benefit-cost ratios of about 9 to 1, and broad adaptation investments exceed 10 to 1 ([GCA](#); [WRI](#)). The record of Bangladesh, which cut cyclone deaths by more than 100-fold over fifty years through shelters, forecasting, and community preparedness, shows what low-cost adaptation can achieve ([Our World in Data](#)). The [COP30 package](#) called for tripling adaptation finance, but implementation, not pledges, will decide outcomes. The strategic conclusion is that mitigation determines how bad the climate becomes, while adaptation determines how much that costs, and the century needs both on a much larger scale.

12. Pollution and Human Health

Health is the clearest success of the convergence story and pollution is one of its clearest failures. Humans live longer than at any time in history, yet the environment they live in is the leading preventable cause of premature death.

Global life expectancy at birth rose from about 46 years in 1950 to about 73 in 2024 and is projected to reach about 77 by 2050 (Figure 11; [UN WPP 2024](#)). Under-five deaths have fallen from about 12 million a year in 1990 to under 5 million ([UN IGME](#)). The COVID-19 pandemic caused an estimated 14.9 million excess deaths in 2020 and 2021 ([WHO](#)) and temporarily reversed life-expectancy gains, but the long-run trend resumed. Health has been the most reliable dimension of convergence: the gap in life expectancy between rich and poor countries has narrowed from about 30 years in 1950 to well under 20 today.

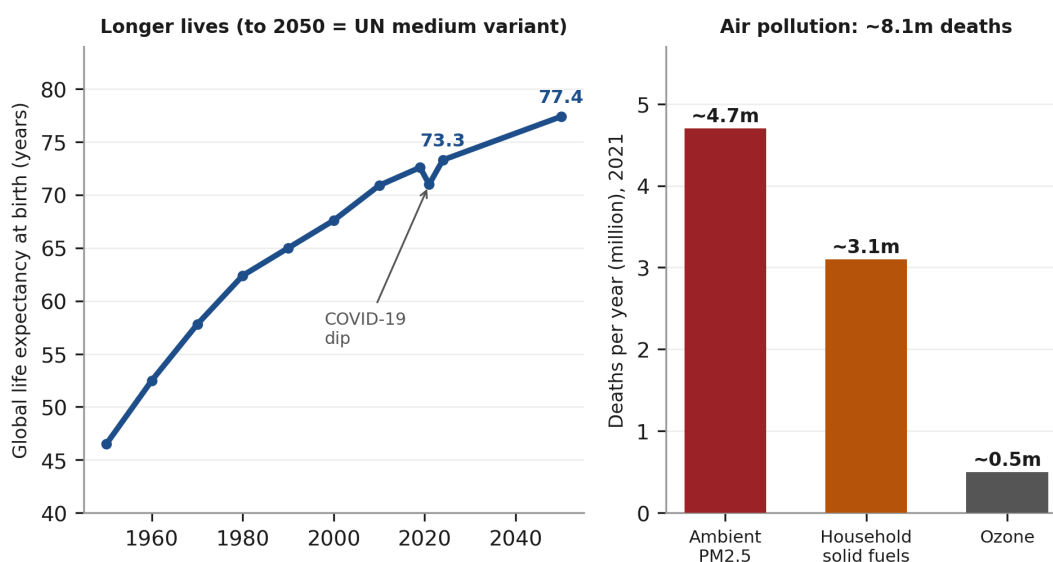


Figure 11. Left: global life expectancy at birth, 1950 to 2050 (approximate). Right: deaths attributable to air pollution by source, 2021 (approximate).

Sources: UN WPP 2024; State of Global Air 2024. H Heuristics rounding.

Pollution as the leading environmental risk

The [State of Global Air 2024](#) reports that air pollution was responsible for about 8.1 million deaths in 2021, the second leading risk factor for death worldwide after high blood pressure, including about 700,000 deaths of children under five. Roughly 4.7 million deaths were attributed to ambient fine particles, about 3.1 million to household air pollution from cooking with solid fuels, and about half a million to ozone. The burden falls overwhelmingly on low- and middle-income countries, especially in South Asia and Sub-Saharan Africa. The [Lancet Commission on Pollution and Health](#) estimated that all forms of pollution, including lead and chemicals, caused about 9 million deaths in 2019, about one in six deaths worldwide. About 2.1 billion people still cook with polluting fuels ([WHO](#)), a problem that distributed clean energy and clean cooking can solve at low cost.

Pollution is also the most tractable of the planetary risks, because the successes are real. The Montreal Protocol has phased out the great majority of ozone-depleting substances and is expected to restore the ozone layer to 1980 levels within decades ([EPA](#)). China cut average fine-particle concentrations by roughly 40 per cent between 2013 and 2020 ([Air Quality Life Index](#)). The remaining challenges are chemical and plastic pollution, which are growing, and for which the governance gap is widest: negotiations on a global plastics treaty ended in August 2025 without agreement ([UNEP](#)).

Emerging health risks

- **Antimicrobial resistance.** The *Lancet* estimates that bacterial resistance directly caused about 1.14 million deaths in 2021 and could cause about 39 million cumulative deaths between 2025 and 2050 ([Naghavi et al., Lancet](#)).
- **Pandemics.** The WHO Pandemic Agreement was adopted in 2025, but negotiations on its pathogen-access and benefit-sharing annex were extended in May 2026, leaving the operational core unfinished ([WHO](#)). The [Pandemic Fund](#) has begun to finance preparedness, at a scale well below the need.
- **Non-communicable disease and ageing.** As populations age, cardiovascular disease, cancer, diabetes, and dementia become the dominant causes of illness in every region, shifting health spending from infectious disease to chronic care.
- **Climate and heat.** Heat-related mortality is rising, and climate change increases the range of vector-borne diseases and the risk of crop failure and undernutrition ([Lancet Countdown](#)).
- **Funding.** Official development assistance fell in 2024 and is projected to fall further, with global health among the most exposed budgets ([OECD](#)).

The policy implication is that pollution control and health investment have unusually high returns and unusually short payoffs: cleaner air improves health within years, not decades. They are among the most efficient risk-reduction tools available and are strongly complementary with the energy transition, because replacing fossil combustion reduces both climate and air-pollution burdens.

13. Biodiversity and Ecosystem Stability

Biodiversity loss is the slowest-moving and least visible of the century's major risks, and the one that is hardest to reverse. Ecosystems provide the services, including pollination, water purification, soil fertility, and climate regulation, on which the human economy rests.

The [Living Planet Report 2024](#) finds that monitored vertebrate populations have declined by an average of 73 per cent between 1970 and 2020, with freshwater populations down 85 per cent, terrestrial 69 per cent, and marine 56 per cent (Figure 12). The index tracks relative abundance, not species extinction, and its average masks wide variation, but it describes a decline without precedent in recorded history. The [IPBES Global Assessment](#) estimated that about one million species are threatened with extinction and that three-quarters of land and two-thirds of the ocean have been significantly altered by human activity. Studies of extinction rates put them one to two orders of magnitude above the background rate of the fossil record ([Ceballos et al.](#)), although scientists disagree about whether the term "sixth mass extinction" is yet appropriate.

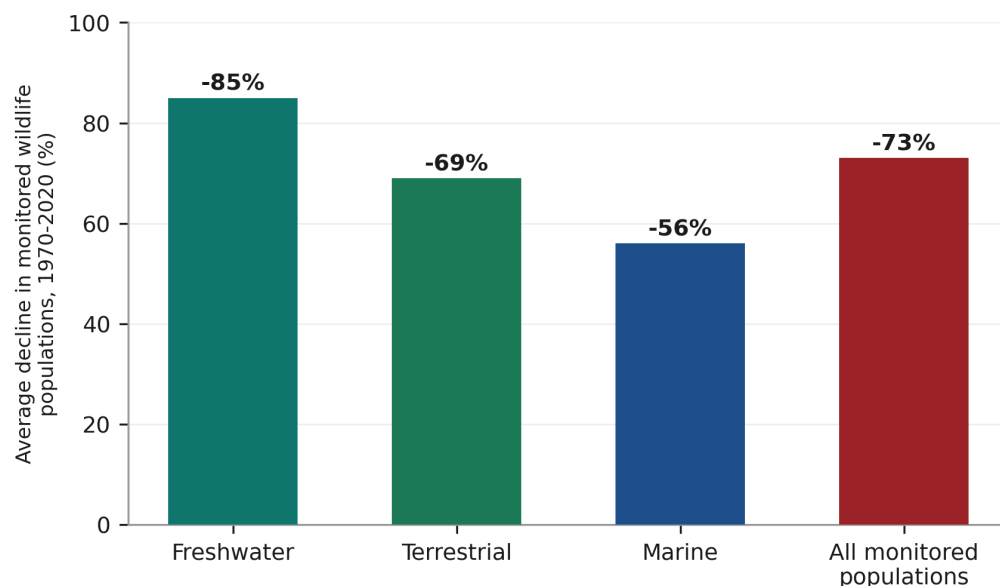


Figure 12. Average decline in monitored wildlife populations by realm, 1970 to 2020.

Source: WWF/ZSL Living Planet Report 2024.

Why ecosystem stability matters economically

About half of world GDP, roughly US\$44 trillion, is moderately or highly dependent on nature, according to analysis by the [World Economic Forum](#). Pollinators underpin a large share of food production; wetlands and mangroves reduce flood risk; forests regulate regional rainfall and store carbon; healthy fisheries feed billions, yet more than a third of assessed fish stocks are overfished ([FAO](#)). The point is less that any single species is indispensable than that ecosystems provide redundancy, and that redundancy is what allows food and water systems to absorb droughts, pests, and disease. Reduced biodiversity reduces that insurance.

The planetary boundaries picture

Table 4. The nine planetary boundaries: status in the 2023 assessment

Boundary	Status	Note
Climate change	Transgressed	CO2 and radiative forcing both beyond safe levels
Biosphere integrity	Transgressed	Both genetic and functional diversity beyond the boundary
Land-system change	Transgressed	Forest cover well below the safe level
Freshwater change	Transgressed	Blue and green water disruption
Biogeochemical flows	Transgressed	Nitrogen and phosphorus far beyond safe levels
Novel entities	Transgressed	Synthetic chemicals and plastics outpace assessment
Ocean acidification	Close to boundary	Under pressure; later work suggests it is at or near the boundary
Atmospheric aerosols	Within (regionally exceeded)	South Asia and parts of East Asia exceed regional limits
Stratospheric ozone	Within	Recovering under the Montreal Protocol

Source: Richardson et al. (2023), Science Advances. Status refers to global control variables; regional exceedance occurs for aerosols.

Coral reefs, tipping points, and the case for action

The fourth global coral bleaching event, declared in 2024, affected more than 80 per cent of the world's reef area ([NOAA](#)), and assessments now conclude that warm-water reefs have probably passed a climate tipping point ([Global Tipping Points](#)). On land, the Amazon is near a dieback threshold where deforestation and drought could convert rainforest into savannah. These are not isolated losses: they interact with climate, food, and livelihoods in the way Section 14 describes.

Responses exist. The Kunming-Montreal Global Biodiversity Framework commits countries to protect 30 per cent of land and sea by 2030 and to restore degraded ecosystems ([CBD](#)). Conservation has produced real recoveries where it has been resourced. The principal challenge is implementation and finance: the framework's finance goals are far from being met, and protected-area designations frequently fail to translate into management. The most effective approach, in our judgement, integrates biodiversity with climate and development finance: protecting forests, restoring mangroves and wetlands, and shifting subsidies that drive land conversion are climate, adaptation, and biodiversity policies simultaneously.

14. The Global Polycrisis Framework

A polycrisis is not a list of crises. It is a system in which the interactions among risks matter more than the risks themselves. The distinguishing question is not how large each threat is, but how tightly each is coupled to the others.

Systemic risk analysis begins with a distinction between hazards and the channels through which they spread. Hazards, such as a drought, a pandemic, a financial panic, a cyberattack, or a war, are as old as history. What has changed is the density of the channels. Global supply chains, financial markets, energy networks, digital infrastructure, and information systems have become tightly interlinked, which increases efficiency in normal times and reduces the buffers available in abnormal ones. The Cascade Institute defines a global polycrisis as a cluster of risks that are causally entangled and that produce harms greater than the sum of the parts ([Lawrence et al.](#)).

The 2020s as a natural experiment

The early 2020s offered a live demonstration. A pandemic disrupted supply chains and widened fiscal deficits; a war in Europe turned an energy and fertiliser shock into a food-price shock across Africa and Asia; the monetary tightening that followed raised borrowing costs for dozens of developing economies; extreme heat and floods struck countries already stressed by debt. None of these events was unforeseeable, but their combination produced losses and political effects that a hazard-by-hazard analysis would have underestimated. Sixty-one economies now spend at least a tenth of government revenue on interest ([UNCTAD](#)); 3.4 billion people live in countries that spend more on debt service than on health or education.

Mapping the interactions

To make the interactions explicit we constructed an expert-judgement interaction matrix across ten systems: climate, pollution, biodiversity, resources, geopolitics, debt and finance, AI and technology, health, demography, and governance (Figure 13). Cells are scored from 0 to 3 for how strongly pressure in the row system amplifies or constrains the column system. The scoring is subjective and should be read as structured judgement, not measurement. Even so, three patterns are robust.

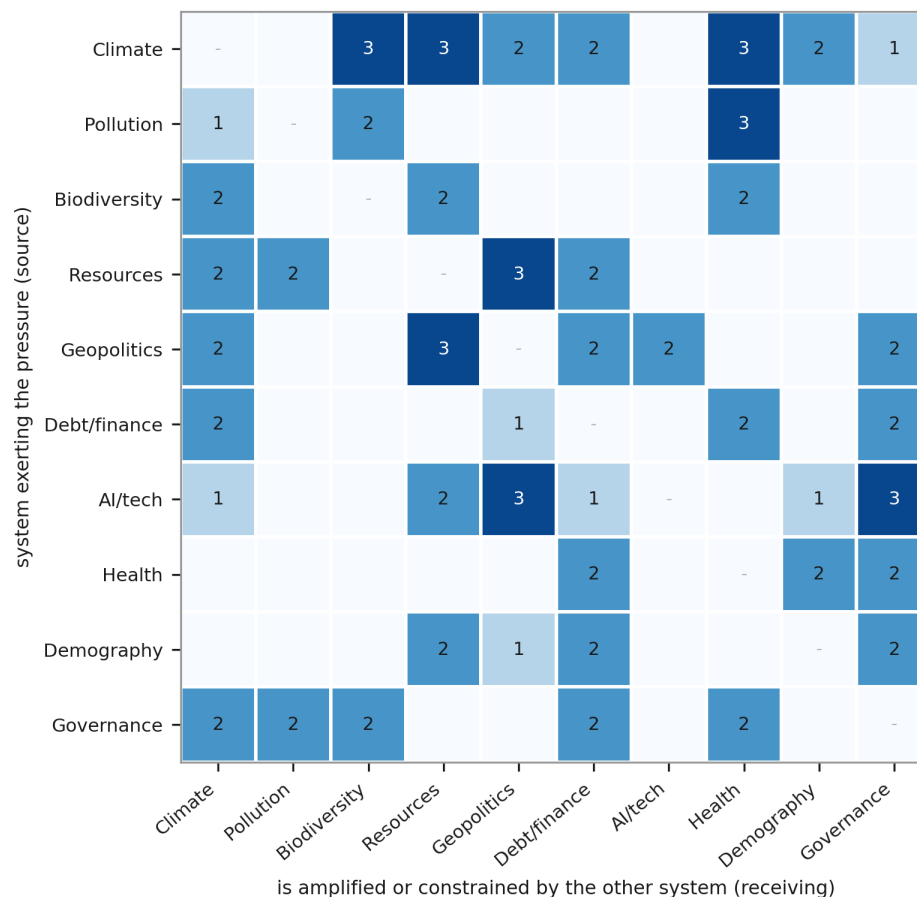


Figure 13. Interaction matrix: strength with which pressure in the row system amplifies or constrains the column system (0 to 3; blank = negligible).

Source: H Heuristics expert-judgement scoring. Illustrative.

- Climate is the largest transmitter.** Climate pressure scores highest on outgoing influence, acting on biodiversity, resources, and health most strongly and on debt, demography, and geopolitics moderately. It is the system through which physical stress enters the social and economic ones.
- Geopolitics and AI are the second-largest transmitters.** Geopolitical conflict acts on resources and finance; technology acts on governance and geopolitics. These are the systems through which stress is amplified or institutionally mismanaged.
- Debt, health, resources, and governance are the main receivers.** The systems with the highest incoming scores are those that mediate how shocks convert into human consequences. A country with fiscal space, working health systems, and capable institutions absorbs a climate shock; one without them experiences it as a crisis.

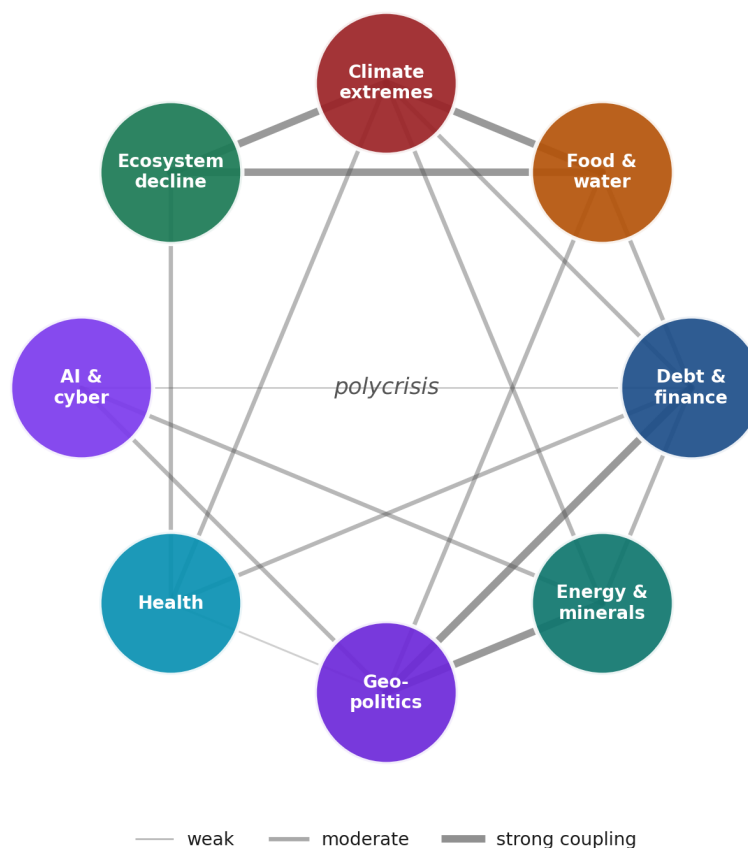


Figure 14. The polycrisis as a network: eight coupled risk domains. Line weight indicates the strength of coupling.

Source: H Heuristics conceptual schematic, consistent with Figure 13.

Amplifiers and dampeners

Four conditions amplify cascades: **synchronicity** (several shocks striking at once), **concentration** (single points of failure in supply chains, finance, or digital infrastructure), **thin buffers** (low reserves, high debt, just-in-time systems), and **legitimacy loss** (declining trust, which weakens collective response). Four conditions dampen them: **diversification**, **buffers and pre-arranged finance**, **institutional capacity**, and **social cohesion**. The 2020s evidence suggests that dampeners, not the size of the initial shock, explain why some countries recover and others do not. Barbados, which negotiated a pre-arranged disaster clause and resilience financing, and Bangladesh, which invested decades in early warning, illustrate the pattern ([IMF](#)).

Can progress outpace systemic risk?

The central question of the report can now be posed analytically. Convergence forces, falling fertility, rising education, cheaper clean energy, and diffusing technology, are slow, cumulative, and largely self-reinforcing. Systemic risks are, in contrast, subject to thresholds and tipping behaviour: they may accumulate quietly and then change abruptly. A race between a slow, steady variable and a fast, nonlinear one has a characteristic outcome: the steady variable wins on average, but loses in the tails. The strategic

corollary is that investments should be assessed by their effect on the tail as well as the mean. A power system that is cleaner and more distributed, a financial system with pre-arranged liquidity, a health system with surge capacity, and an international order with working arms control all reduce the probability that a manageable shock becomes a cascade.

15. Geopolitics and Multipolarity

The post-1991 era of American primacy has ended without being replaced by any stable alternative. The twenty-first century's order will be multipolar, contested, and shaped by the question of whether great powers can compete without fighting.

The evidence of a more dangerous international environment is substantial. Global military expenditure reached a record of about US\$2.7 trillion in 2024, the steepest annual rise in at least three decades ([SIPRI](#)). The Uppsala Conflict Data Program recorded 61 state-based armed conflicts in 2024, the highest number since records began in 1946 ([UCDP](#)). The last treaty limiting the US and Russian nuclear arsenals expired in February 2026, and the Bulletin of the Atomic Scientists set the Doomsday Clock at 85 seconds to midnight, the closest since its creation in 1947 ([Bulletin of the Atomic Scientists](#)). The [WEF Global Risks Report 2026](#) identifies geoeconomic confrontation among the most likely triggers of a global crisis.

What multipolarity looks like

Multipolarity is not simply a world with more powers; it is a world with more independent decision-makers and fewer shared defaults. The United States and China are the two peers, but a growing group of middle powers, including India, Turkey, Saudi Arabia, the United Arab Emirates, Indonesia, Brazil, and others, pursue diversified alignments rather than permanent bloc membership. They trade with one party and buy arms from another, join the BRICS and the G20, and hedge between security guarantees. This produces a more fluid order in which issue-specific coalitions matter more than institutions, and in which the cost of exit from existing arrangements is low.

Table 5. Three possible forms of the multipolar order

Form	Features	Stability	Implication for convergence
Managed concert	Great powers accept mutual restraint; arms control and trade rules updated	High	Supports convergence and climate cooperation
Competing blocs	Two or more economic and technological blocs; selective cooperation	Medium	Slower growth; duplication; cooperation limited to narrow areas
Disorder	Proxy wars, weaponised trade, collapse of arms control	Low	Convergence reverses; tail risk rises sharply

Stylised H Heuristics typology.

Economic fragmentation and its costs

Fragmentation of trade and investment into blocs is the most direct economic channel. The IMF estimates that severe geoeconomic fragmentation could reduce global output by up to seven per cent in the long run, with the largest losses falling on low-income countries that depend on open trade and technology transfer ([IMF Staff Discussion Note](#)). Export controls on semiconductors and critical minerals, sanctions and counter-sanctions, and industrial subsidies are reshaping supply chains toward resilience and security and away from least-cost efficiency. Some of this is prudent; the risk is that security logic crowds out the cooperation required for shared problems such as climate, pandemics, and AI governance.

The tail risk that overrides convergence

The decisive geopolitical fact for this report is that great-power war is the one risk that can reverse convergence directly, quickly, and globally. A conflict over Taiwan, a direct confrontation between NATO and Russia, or an India-Pakistan nuclear exchange would disrupt trade, finance, and energy at scales that dwarf any climate shock, and the nuclear dimension introduces a catastrophic tail. The SIPRI Yearbook documents continuing modernisation of every nuclear arsenal ([SIPRI Yearbook 2026](#)). Preventing such an outcome is, in effect, the highest-value contribution to long-run prosperity. The essential policy elements are unglamorous: crisis communication channels, arms-control successors, mutual transparency on new technologies, and a willingness to compartmentalise cooperation on shared threats from rivalry on contested ones.

16. Cities, Infrastructure, and Urbanization

The twenty-first century will be the century in which humanity completes its transition from a rural to an urban species. The cities built in the next three decades, mostly in Asia and Africa, will lock in patterns of emissions, vulnerability, and opportunity for generations.

The UN projects that the world's urban share will rise from about 55 per cent in 2018 to about 68 per cent in 2050, adding about 2.5 billion urban residents, nearly 90 per cent of them in Asia and Africa. India, China, and Nigeria alone account for about 35 per cent of the growth ([UN World Urbanization Prospects](#)). Africa and Asia are the least urbanised regions today and will therefore see the most rapid change (Figure 15). The 2025 revision, using a harmonised Degree of Urbanisation definition, finds that the world is considerably more urbanised than national definitions imply, with roughly four in five people living in cities or towns ([UN DESA](#)).

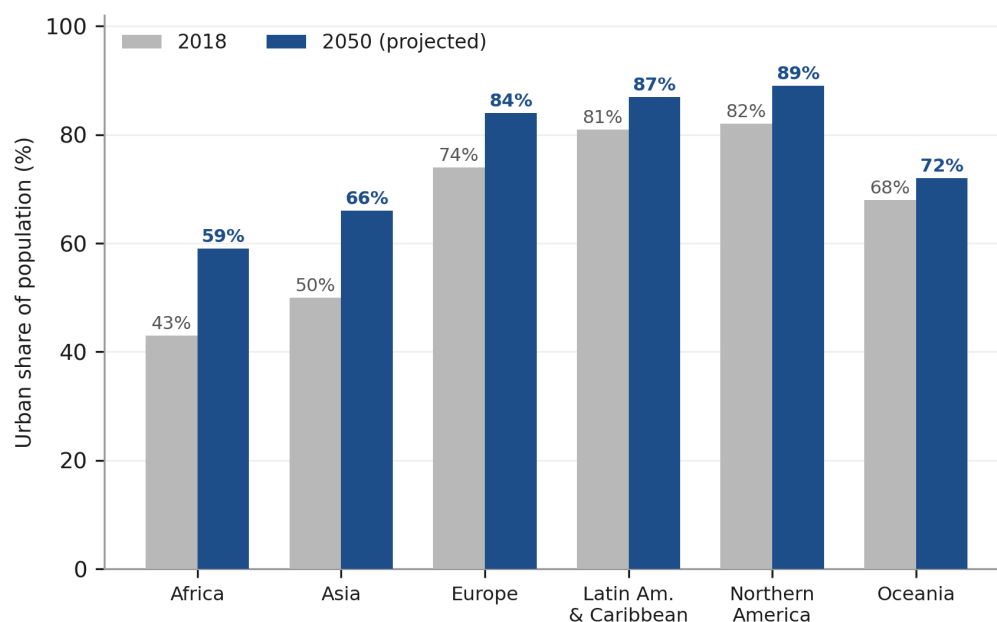


Figure 15. Urban share of population by region, 2018 and 2050 (UN, national definitions).

Source: UN World Urbanization Prospects 2018, rounded.

The economics of cities

Cities are engines of productivity: dense labour markets, knowledge spillovers, and economies of scale in infrastructure raise output per worker and reduce the per-capita cost of services ([Brookings](#)). But the benefits depend on infrastructure. About 1.1 billion people live in slums or informal settlements ([UN-Habitat](#)), and many African cities have urbanised without industrialising, producing what researchers call consumption cities with limited export capacity. Closing the global infrastructure gap is a very large task, often estimated at tens of trillions of dollars over the next two decades, and the quality of the investment matters as much as the quantity.

Heat, flood, and resilience

Cities concentrate climate exposure. Urban heat islands raise temperatures by several degrees; coastal and delta cities face sea-level rise and storm surge; informal settlements are typically built on the most hazard-prone land. Resilient infrastructure is among the highest-return investments available: the World Bank estimates that every dollar invested in resilient infrastructure in low- and middle-income countries yields about four dollars of benefit ([World Bank, Lifelines](#)). City-level heat action plans, such as Ahmedabad's cool-roof and early-warning programme, have demonstrated measurable reductions in heat mortality at low cost ([NRDC](#)). Rising incomes also mean rising demand for cooling, projected to triple by 2050 ([IEA](#)).

Cities as decarbonisation levers

Cities account for the majority of energy-related emissions, but compact, well-planned cities consume less energy per person than sprawl. Decisions about density, transit, building codes, and district energy made now in fast-growing cities will determine whether they lock in carbon-intensive or low-carbon pathways. Because most of the infrastructure that will exist in 2050 in Africa and South Asia has not yet been built, the opportunity for leapfrogging is large. It is also time-limited.

17. Human Exposure and Survivability Risk

Beyond the question of how prosperous the world will be is a more basic question: how likely is it that human civilisation is severely damaged or destroyed? The answer is that the probability is small per year but not negligible over a century, and that it is dominated by a handful of tail risks.

We distinguish four tiers of risk by severity. **Tier 1, hazard exposure:** large numbers of people exposed to floods, heat, drought, and storms, with high but regionally bounded losses. **Tier 2, systemic regional failure:** cascading events that overwhelm the capacity of states or regions, such as famine, state collapse, or mass displacement. **Tier 3, global catastrophic risk:** events that kill or displace at least a tenth of humanity or cause widespread collapse of global systems. **Tier 4, existential risk:** events that permanently destroy humanity's long-term potential. Each tier is much less probable than the last but much worse in consequence.

Tier 1 and 2: the exposure picture

Exposure to physical hazard is already large and will grow. About 1.8 billion people, 23 per cent of the world's population, are exposed to a one-in-a-hundred-year flood ([Rentschler et al., *Nature Communications*](#)). Under a high-emissions path, a study in *PNAS* estimated that by 2070 about one in three people could live in conditions as hot as the hottest 0.8 per cent of Earth's land today ([Xu et al., *PNAS*](#)); another analysis estimated that each 0.1 °C of additional warming pushes roughly 140 million more people outside the climate conditions in which human societies have historically thrived ([Lenton et al., *Nature Sustainability*](#)). Exposure is not destiny: vulnerability and adaptive capacity determine outcomes, and richer, better-governed places have repeatedly demonstrated that large hazards can be survived. The risk is greatest where exposure, poverty, and weak institutions coincide: the Sahel, South Asia's deltas, and fragile states.

Tier 3 and 4: the tail risks

The most systematic effort to assess tail risk is the philosopher Toby Ord's estimate that the probability of an existential catastrophe in this century is about one in six, a figure that rests on informed judgement rather than frequency data and should be read as an order-of-magnitude statement (Figure 16; [Ord](#)). The largest components are unaligned artificial intelligence (about 1 in 10) and engineered pandemics (about 1 in 30); nuclear war and climate change are each assessed at about 1 in 1,000 for existential outcomes, though they carry far higher probabilities of catastrophic but non-extinction harm. A study of nuclear winter estimated that a full-scale war between the United States and Russia could cause more than five billion deaths from famine ([Xia et al., *Nature Food*](#)). The [RAND/DHS Global Catastrophic Risk Assessment](#) reaches a similar ranking of concerns.

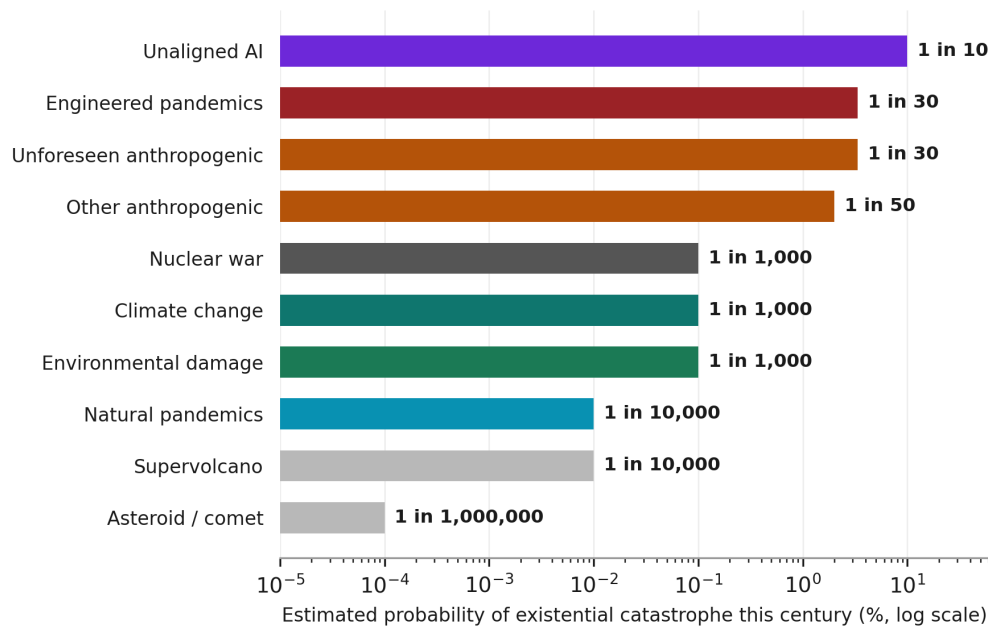


Figure 16. *Estimated probability of existential catastrophe this century, by source (Ord, 2020).*

Source: Ord, *The Precipice* (2020). Subjective probabilities; log scale.

How to think about survivability

Three points temper both complacency and fatalism. First, the climate system alone is unlikely to threaten human extinction; its danger lies in how it multiplies other risks, through famine, displacement, and conflict, and in the tipping dynamics discussed in Section 11. Second, the tail risks that matter most are those under direct human control: the development and governance of AI, the biosecurity of laboratories and synthesis technologies, and nuclear command and arms control. Third, resilience is a function of redundancy, diversity, and the capacity to recover. A world with distributed energy, diversified food and supply chains, strong public health systems, and tested institutions can absorb shocks that would break a brittle one.

The practical implication is that risk reduction is an investment in the continuation of convergence, not a separate agenda. Most of the interventions that reduce survivability risk, such as biosecurity, early warning, and arms control, are cheap relative to the losses they prevent, yet remain badly under-funded relative to their expected value.

18. Sustainable Development as Risk Mitigation

Sustainable development is usually presented as a moral agenda. It is at least as persuasive as a risk-management strategy: the investments that reduce poverty, improve health, educate girls, and expand clean energy are the same ones that reduce vulnerability to shocks and the probability that shocks cascade.

The mid-point review of the 2030 Agenda is sobering. The latest UN assessment finds that only about a third of Sustainable Development Goal targets are on track or progressing at a moderate pace, and that nearly one in five have regressed since 2015 ([UN SDG Report 2025](#)). About 800 million people still live in extreme poverty on the World Bank's updated threshold of US\$3 a day, concentrated increasingly in Sub-Saharan Africa and fragile states ([World Bank Poverty and Inequality Platform](#)). About 673 million people were undernourished in 2024 ([FAO, SOFI](#)). The financing environment has become more difficult: the 2025 Sevilla Commitment set out a reform agenda for development finance but did not close the gap between the scale of need and the resources available ([UN](#)).

Development as vulnerability reduction

Disaster mortality is overwhelmingly a function of poverty and governance rather than of hazard alone. Countries with higher income, better building standards, and functioning early-warning systems experience far fewer deaths from comparable hazards. The WMO's atlas of weather and climate disasters shows that while economic losses have risen with exposure, deaths have fallen sharply over the past five decades, an outcome attributable largely to forecasting, preparedness, and development ([WMO](#)). The same logic applies to food, health, and financial shocks: households and states with buffers weather them; those without suffer lasting damage.

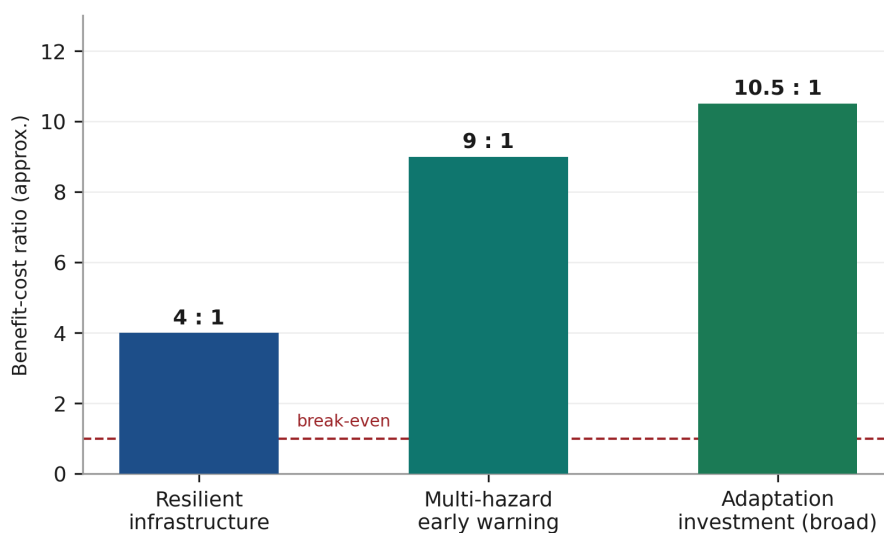


Figure 17. Approximate benefit-cost ratios of selected resilience investments.

Sources: World Bank, Lifelines (resilient infrastructure); GCA/UN Early Warnings for All; WRI (adaptation). Rounded.

Triple-duty investments

A risk-based approach prioritises investments that deliver development, mitigation, and resilience benefits at once. Table 6 lists those we consider highest-value.

Table 6. High-value development investments that also reduce systemic risk

Investment	Development benefit	Risk channel reduced
Girls' education and learning quality	Income, health, lower fertility	Demographic pressure; adaptive capacity
Distributed clean power and clean cooking	Energy access; health; jobs	Fuel-price shocks; air pollution; emissions
Early warning and adaptive social protection	Income stability for poor households	Disaster losses; food-price shocks; unrest
Digital public infrastructure	Inclusion; lower transaction costs	Delivery speed in crises; fiscal leakage
Primary health and pandemic preparedness	Longer lives; productivity	Pandemic and antimicrobial-resistance risk
Resilient transport, water, and power networks	Growth; urban liveability	Cascading infrastructure failure
Debt transparency and pre-arranged finance	Fiscal space	Sovereign-debt crises; delayed disaster response

H Heuristics assessment; evidence links are given in the corresponding sections.

Why the agenda stalls, and what changes it

The agenda stalls for structural reasons that are familiar: capital is scarce and expensive in precisely the countries that need it; development finance is fragmented and short-term; and political attention is dominated by immediate crises. Four shifts would change the picture. **Lower the cost of capital** through guarantees, currency-risk instruments, and multilateral development bank reform ([Bridgetown Initiative](#)). **Align climate and development finance** so that adaptation, clean energy, and social protection are financed together. **Build institutional capacity** in delivery, data, and anticipatory governance. **Treat resilience as infrastructure**, with pre-arranged financing triggered by hazards. The central point for this report is that development finance should be assessed as a systemic risk instrument: dollars that raise incomes in the places with the greatest demographic weight, from the Sahel to the Ganges, are an investment in global stability.

19. Regional Outlooks to 2100

The century's headline forces play out differently in each region. The table below summarises demographic trajectory, principal opportunity, principal risk, and our overall outlook for nine regions.

Table 7. Regional outlooks to 2100

Region	Population trajectory	Principal opportunity	Principal risk	Outlook
East Asia	Peaks now; China about 1.4bn to 0.63bn by 2100	Technology and manufacturing leadership; productivity-led ageing	Rapid ageing; property debt; Taiwan Strait	Rich, old, contested
South Asia	India peaks near 1.7bn in the 2060s	Largest labour-force gains; digital public infrastructure	Heat, floods, water; jobs; India-Pakistan	High growth, high exposure
South-East Asia	Peaks mid-century	Supply-chain diversification; clean-power export	Sea-level rise; middle-income trap	Upward, uneven
Sub-Saharan Africa	About 1.2bn to about 3.4bn	Demographic dividend; solar; AfCFTA	Jobs, debt, governance, climate	Widest range of outcomes
Middle East and North Africa	Moderate growth then plateau	Solar and hydrogen exports; diversification	Water scarcity; extreme heat; conflict	Transition dependent
Europe	About 0.74bn to 0.59bn	Institutions; green industry; high living standards	Ageing; low growth; security	Stable, slowly declining share
North America	About 0.38bn to 0.43bn	Innovation; immigration; energy abundance	Polarisation; debt; climate costs	Prosperous but contested
Latin America	Peaks around 2050s; modest decline	Renewables; critical minerals; food	Inequality; crime; Amazon dieback	Moderate; commodity-sensitive
Russia and Central Asia	Russia declining; Central Asia growing	Energy, minerals, geography	War and sanctions; water; demography	Divergent

Population figures are approximate UN WPP 2024 medium-variant values; outlooks are H Heuristics judgements.

Three cross-regional observations stand out. First, **the winners and losers of the century will be decided more by institutions than geography**. The regions with the greatest risk exposure, South Asia, Africa, and parts of the Middle East, are also the regions with the greatest demographic weight, so their trajectories determine the global average. Second, **ageing and population decline are not regional but global phenomena**: by 2100 every region except Africa will have a shrinking population. Third, **the regional outlooks are interdependent**. African prosperity depends on Asian demand and finance; Asian prosperity depends on stable energy and export markets; Western prosperity depends on both labour and markets from the rest. The outlook for any region is therefore partly a function of how the others do, which is a defining feature of a convergent but coupled world.

20. Alternative Futures: Best, Worst, and Most Likely Scenarios

Scenarios are not predictions. They are disciplined stories about how drivers combine, intended to show what would have to be true for each outcome and what choices separate them. We describe three futures to 2100 and assign subjective weights.

Scenario A: Resilient convergence (about 20 per cent)

In the best case, the clean-energy transition accelerates beyond current policy, global emissions peak before 2030 and fall steeply, and warming peaks near 1.7 °C before declining slowly. The Global South gains access to affordable capital through multilateral reform, and Africa and South Asia convert demographic weight into productivity gains through education, cities, and trade integration. AI diffuses widely and raises productivity, with governance preventing the worst concentration and misuse. Great-power competition is contained by renewed arms-control agreements and managed economic interdependence. Global income per person grows at about 2.5 to 3 per cent a year, extreme poverty is essentially eliminated by mid-century, and the world population peaks near 9.7 billion and declines gently. Crises still occur, but institutions and buffers prevent cascades.

Scenario B: Uneven progress with overshoot (about 55 per cent)

In the central case, convergence continues but unevenly. Clean-energy deployment is rapid but not rapid enough: emissions fall slowly after 2030, warming overshoots 2 °C in the 2050s and reaches about 2.7 °C by 2100. Asia grows steadily as China matures and India rises; Africa grows but below its potential because of jobs, debt, and governance constraints. The multipolar order is contested but avoids great-power war; trade fragments into partially overlapping blocs, and global cooperation is limited to narrow areas. AI raises productivity moderately and unevenly, widening inequality within and between countries. Climate disasters, regional conflicts, and financial stress recur and cause large but bounded losses. Global income per person grows at about 1.5 to 2 per cent a year, poverty falls more slowly, and the world population peaks near 10 billion in the 2080s. This is a world that is, on almost any measure, better off in 2100 than in 2025, and one that experiences substantial avoidable suffering along the way.

Scenario C: Fracture and cascade (about 25 per cent)

In the worst case, one or more major shocks occur in a system with thin buffers. Possible triggers include a great-power war over Taiwan or in Europe, a severe engineered pandemic, a major financial crisis rooted in sovereign debt, or the early crossing of a major climate tipping point. Because the interaction channels identified in Section 14 are tight, the initial shock is amplified through trade, finance, food, and political legitimacy. Warming reaches 3.5 to 4 °C by 2100 as investment in decarbonisation collapses and emissions policy is abandoned. Large parts of the Global South suffer sustained income loss, state failure, and mass displacement. Technology becomes a vector of risk rather than recovery. Global income per person grows by well under 1 per cent a year, with long periods of decline. In the extreme tail, civilisational collapse in some regions becomes plausible.

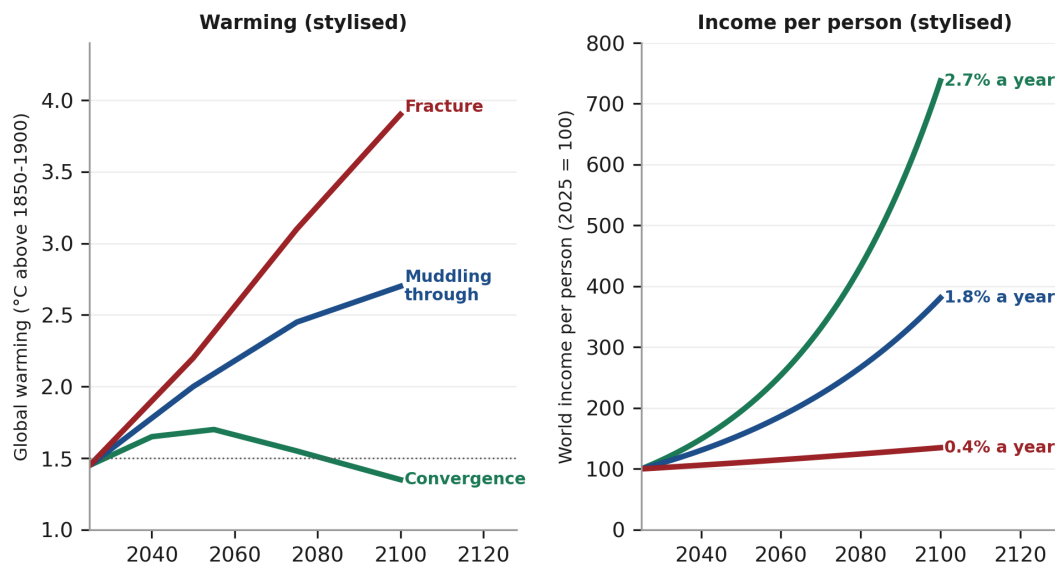


Figure 18. Stylised scenario paths to 2100: warming (left) and world income per person (right). The three scenarios diverge mainly after 2050.

Source: H Heuristics stylised scenarios; income paths are compound-growth illustrations, not forecasts.

Table 8. Scenario comparison, 2100

Dimension	A. Resilient convergence	B. Uneven progress	C. Fracture and cascade
Subjective weight	About 20%	About 55%	About 25%
Warming by 2100	About 1.4 to 1.8 °C after a peak	About 2.5 to 3 °C	About 3.5 to 4 °C
Income per person growth	About 2.5 to 3% a year	About 1.5 to 2% a year	Under 1% a year, with declines
Extreme poverty	Eliminated by mid-century	Falls, concentrated in Africa	Rises in fragile regions
Population peak	About 9.7bn, gentle decline	About 10bn, 2080s	Lower: mortality and fertility shocks
Order	Managed concert	Competing blocs	Disorder; major war risk
Technology	Broadly diffused, governed	Diffused unevenly	Concentrated or weaponised

Stylised H Heuristics scenarios. Weights are subjective judgements.

What separates the scenarios

Three variables carry most of the divergence. **The speed of the energy transition** determines the physical stress on the system and the exposure of the poorest countries. **The quality of institutions in the fast-growing regions**, especially the capacity of India, Indonesia, Nigeria, Ethiopia, and Egypt to turn demographic weight into productivity, determines whether convergence persists. **The avoidance of catastrophic tails**, above all great-power war, determines whether any of the other variables matter. The fact that the central scenario is the most probable, but that the tail scenario is far from negligible, is the basis of the risk-management case for investing heavily in the resilience and prevention measures identified in Section 18.

21. Conclusions: Convergence vs. Crisis

The twenty-first century is a race between a slow, powerful process of convergence and a fast, nonlinear accumulation of systemic risk. On the median path, convergence wins. In the tails, it can lose. The strategic task is to protect the tails without sacrificing the median.

We began by asking whether technological progress and convergence can outpace systemic risk. Our answer has three parts. **First, the forces of convergence are real and mostly self-sustaining.** Demographic transition, expanding education, falling clean-energy and digital costs, and the diffusion of knowledge continue to lift the baseline of global welfare. Even under pessimistic assumptions about climate and geopolitics, most people alive in 2100 will be materially better off than their grandparents. **Second, systemic risk is rising faster than institutions are adapting to it.** The interactions among climate, finance, geopolitics, and technology have created a coupled system with limited buffers. The risk is less that any one hazard overwhelms humanity than that a cascade removes the institutions and financial capacity on which convergence depends. **Third, the outcome is a matter of choices.** The best and worst scenarios differ less in the forces at work than in whether societies invest in buffers, cooperation, and the governance of new technology.

The drivers of prosperity, resilience, and stability

Table 9. Key drivers of prosperity, resilience, and global stability

Prosperity	Resilience	Stability
Education and learning quality, especially for girls	Pre-arranged finance and fiscal buffers	Arms control and crisis communication among nuclear powers
Cheap, abundant, clean power	Early warning and adaptive social protection	Open, rules-based trade with managed security carve-outs
Productive cities and infrastructure	Diversified supply chains and energy systems	Credible, reformed multilateral institutions
Trade integration and regional markets	Strong primary health and pandemic preparedness	Governance of AI and biotechnology
Digital public infrastructure and diffusion of AI	Ecosystem protection and restoration	Debt transparency and restructuring mechanisms
Affordable capital for the Global South	Institutional capacity and social trust	Legitimacy: states that deliver to their citizens

H Heuristics synthesis.

Five priorities

- **Accelerate the energy transition, and finance it where capital is scarcest.** The cost curve has done its work; the binding constraints are financing cost, grids, and speed in the developing world.
- **Invest in resilience as infrastructure.** Early warning, adaptive social protection, resilient networks, and pre-arranged finance are among the highest-return public investments and reduce the likelihood that shocks cascade.

- **Convert Africa's and South Asia's demographic weight into productivity.** Education, power, cities, jobs, and trade integration are the core of the global growth agenda for the second half of the century.
- **Protect the tails.** Arms control, biosecurity, and the governance of advanced AI are inexpensive relative to the stakes, and their neglect is the most striking mismatch between risk and effort in current policy.
- **Rebuild the institutions of cooperation.** A multipolar world can be stable, but only if rival powers invest in the rules, channels, and habits of restraint that primacy once supplied by default.

The century's central finding, in short, is that convergence is the default and polycrisis is the risk. The task of the present generation is not to choose between optimism and pessimism, but to ensure that the slow processes that raise the floor are protected from the fast processes that could remove it.

22. Key Indicators to Watch This Century

A scenario analysis is only useful if it can be tracked. The following dashboard lists indicators that, taken together, would show which path the century is on, with the latest available value and the signal that would warrant revising our assessment.

Table 10. Indicator dashboard

Indicator	Latest value	Signal to watch	Source
Global temperature anomaly	About 1.4 °C (2025); 2024 above 1.5 °C	A five-year mean above 1.6 °C signals overshoot risk	WMO
Fossil CO2 emissions	Record high in 2025	Sustained decline from 2027 signals Scenario A	Global Carbon Project
Clean to fossil energy investment	About 2:1 (US\$2.2tn vs 1.1tn)	Rise above 3:1, with flows to the Global South	IEA
Share of electricity from solar and wind	About 15% (2024)	Doubling by the early 2030s	Ember
Global fertility rate	About 2.25 (2024)	Faster drop in Africa, India	UN WPP
Sub-Saharan Africa electricity access	About 565m without	Mission 300 on track by 2030	Tracking SDG7
Adaptation finance gap	US\$26bn vs US\$310-365bn needed	Public flows above US\$100bn a year	UNEP
Debt burden of developing countries	61 economies spend 10%+ of revenue on interest	Fewer than 40 economies by 2030	UNCTAD
Global military expenditure	About US\$2.7tn (2024)	Continued double-digit rises signal arms race	SIPRI
Nuclear arms control	New START expired Feb 2026; clock at 85 seconds	New bilateral or trilateral limits	Bulletin
Data-centre electricity use	About 415 TWh (2024)	Faster than the IEA base case strains grids	IEA
Wildlife abundance (Living Planet Index)	-73% since 1970	Stabilisation in monitored populations	WWF
Air pollution deaths	About 8.1m a year (2021)	Decline below 7m by 2030	State of Global Air
Extreme poverty	About 800m at US\$3 a day	Resumed decline in Sub-Saharan Africa	World Bank
Forced displacement	More than 115m	A new record signals regional cascades	UNHCR
Expert risk perception	Geoeconomic confrontation among top risks	Convergence of top-risk lists on systemic categories	WEF

Latest values are the most recent figures cited in this report; signals are H Heuristics judgements of what would indicate a shift toward Scenario A (convergence) or C (fracture).

How to read the dashboard

No single indicator tells the story. The most informative signals are the combinations. Falling emissions with falling fertility in Africa and rising electrification would indicate convergence on track. Rising military spending, collapsing arms control, and increasing debt distress at the same time would indicate fracture risk. The key is to monitor the couplings, not the individual series.

A note on this report

This report is a synthesis for general decision-makers, not a forecast. Its projections to 2100 are conditional and uncertain, and the scenario weights are subjective judgements. Readers should consult the cited primary sources, especially for figures that are updated frequently, and treat approximate values in the figures as indicative. We will revise the assessment as the indicators above move. H Heuristics welcomes corrections and challenges to the analysis.