REBOOT DEVELOPMENT

The Economics of a Livable Planet

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WORLD BANK GROUP

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A livable planet promotes ***environmental health*** to improve ***lives, livelihoods and living standards, for all.***

All economic indicators are improving: Poverty, Health, Transport, Energy and Access to WASH

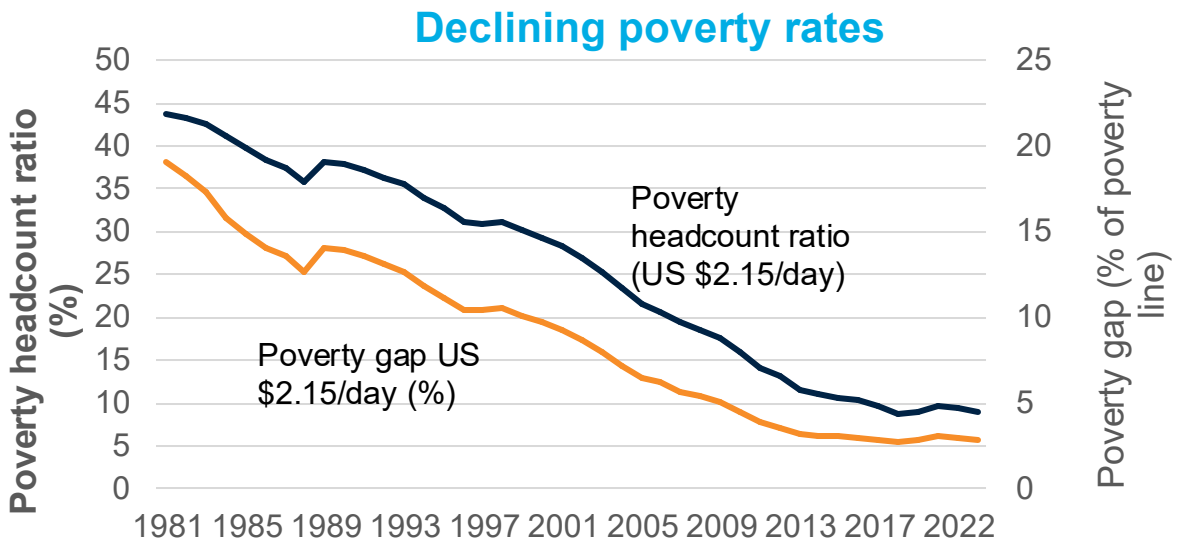
Across most economic indicators over the past 100 years, there has been clear progress. Example:

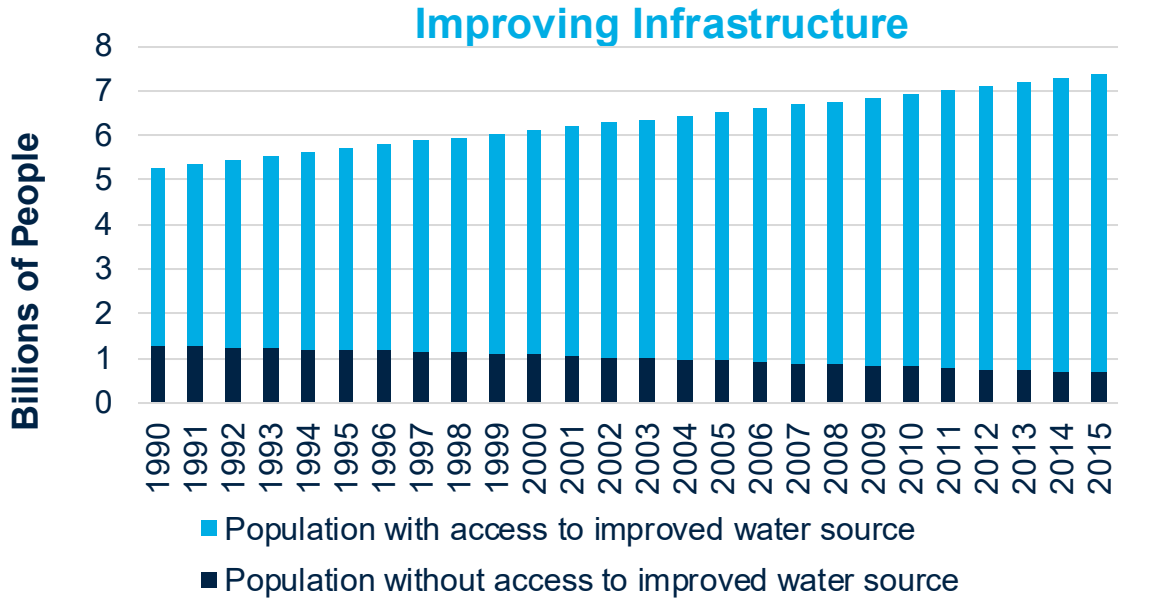
- in 1985, extreme poverty was ~40%; today it is under 9%.
- Infrastructure access—such as safe water—has also risen.

➢ There remains substantial room for improvement.

➢ Distribution is uneven: access is not equal, and conflicts persist.

➢ Overall, on basic standards-of-living measures, progress is significant and hard to deny.





But this progress has come at a price

Humanity's impact – how do we think about this?

Wild mammal biomass has plummeted while human impacts have soared

Lets compare the biomass (weight) of all mammals on Earth

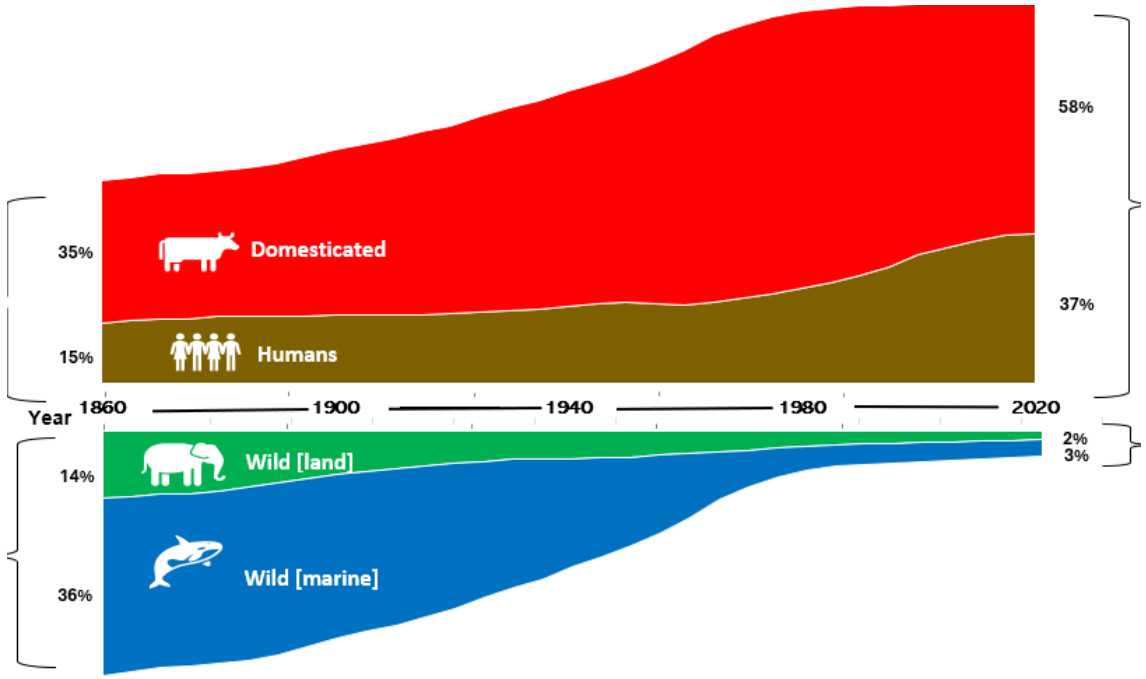
In particular compare the biomass of wild mammals to that of humans and what we eat.

Wild mammals are large so should make up the majority of biomass (weight)

The reality is starkly different:

- Wild mammals today account for <5% of biomass. Whereas humans and what we eat accounts for 95%.
- Such is the impact of the forces weighing against nature

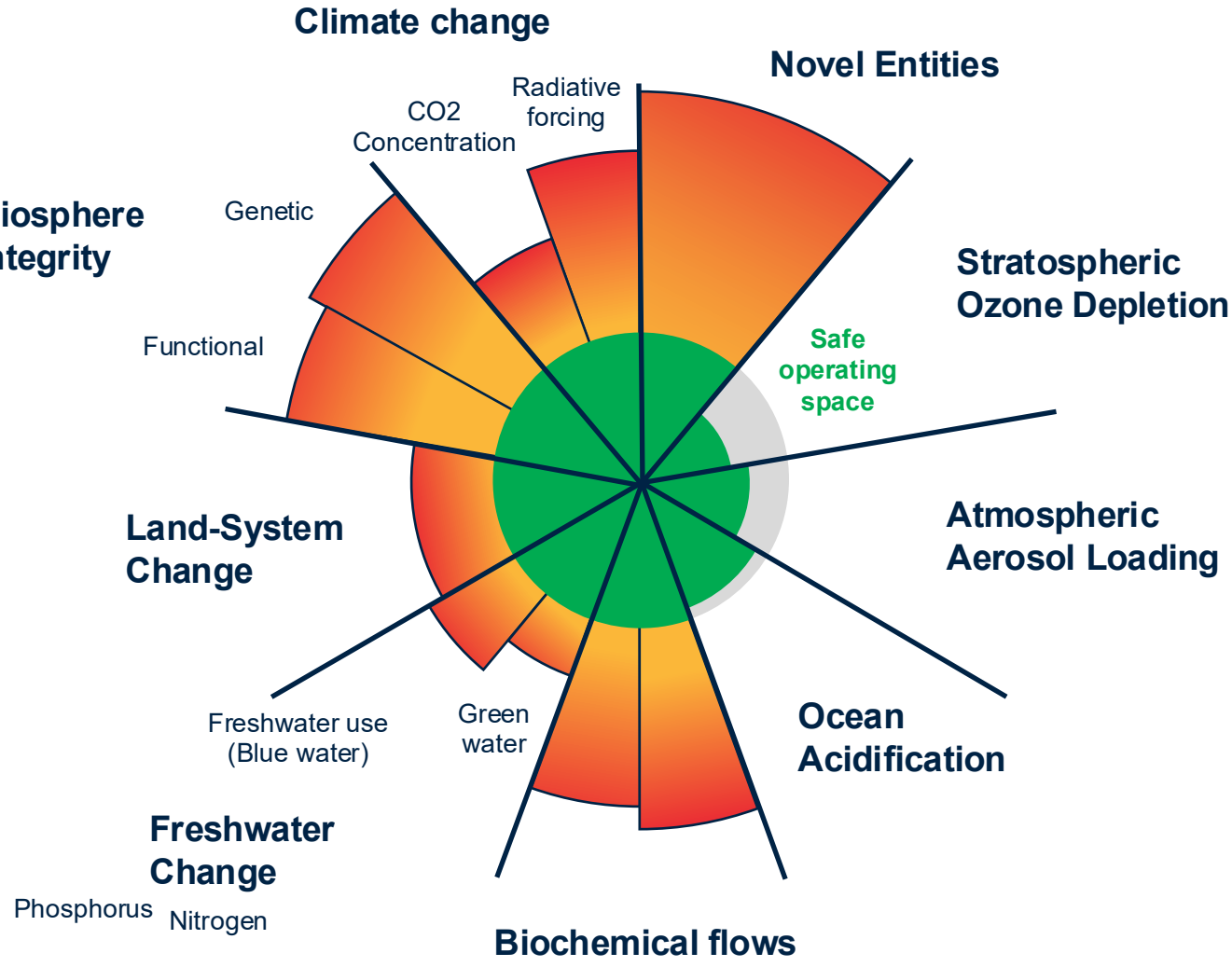
The Indelible Footprint: Humanity's Journey vis-à-vis Nature



State of Earth Systems: 6 of 9 Planetary Boundaries Have Been Crossed

Recent scientific evidence shows that humanity has moved beyond the **"safe operating space"** of key Earth systems. Many changes may be irreversible, as ecosystems cannot quickly recover, and crossing tipping points can trigger feedback loops causing lasting damage.

- Six of the nine planetary boundaries, which define the safe operating space for humanity within Earth's life-support systems, have already been transgressed.

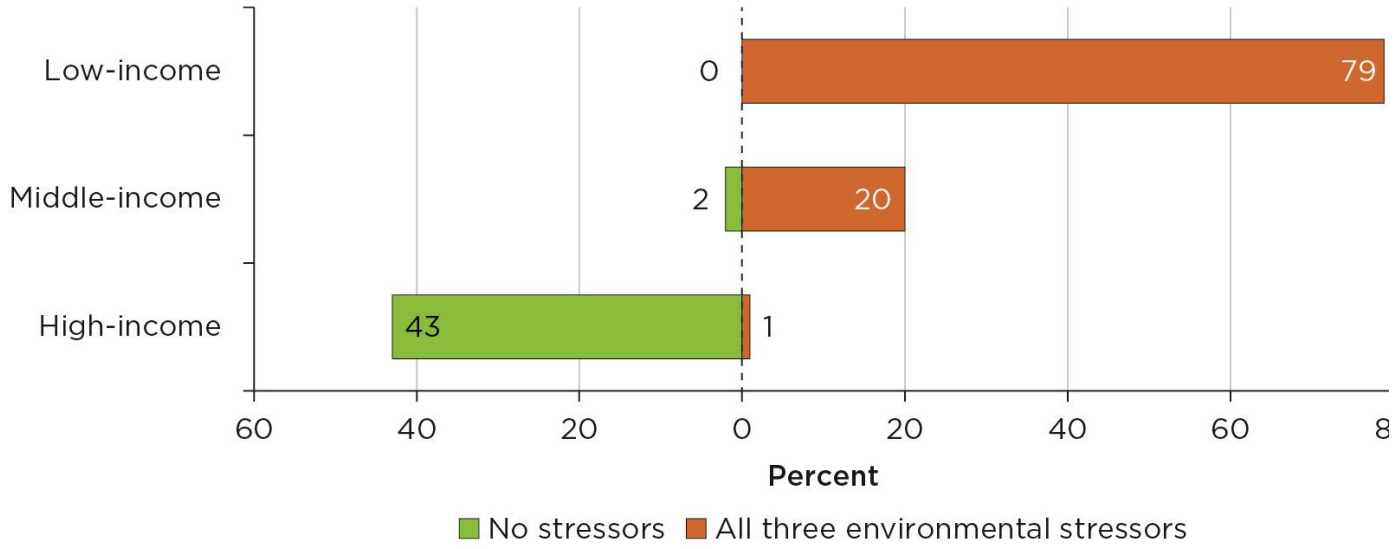


Who is impacted (most)?

Who is exposed to ALL 3 critical stressors:
Air pollution, land degradation and water stress?

- **Close to 80% of *low-income country* residents are exposed to poor air quality, unsafe water, AND degraded land. But only 1% in HICs.**

- By contrast, in high-income countries 43% of people are not exposed to any of the three stressors.



Water is not only essential for life but many scientists also call it the bloodstream of the biosphere.

Where does water come from? It comes from rainfall.

Where does rainfall come from? It comes from the clouds.

Where do the clouds come from? It turns out that 50 percent of the clouds and rainfall come from the ocean.

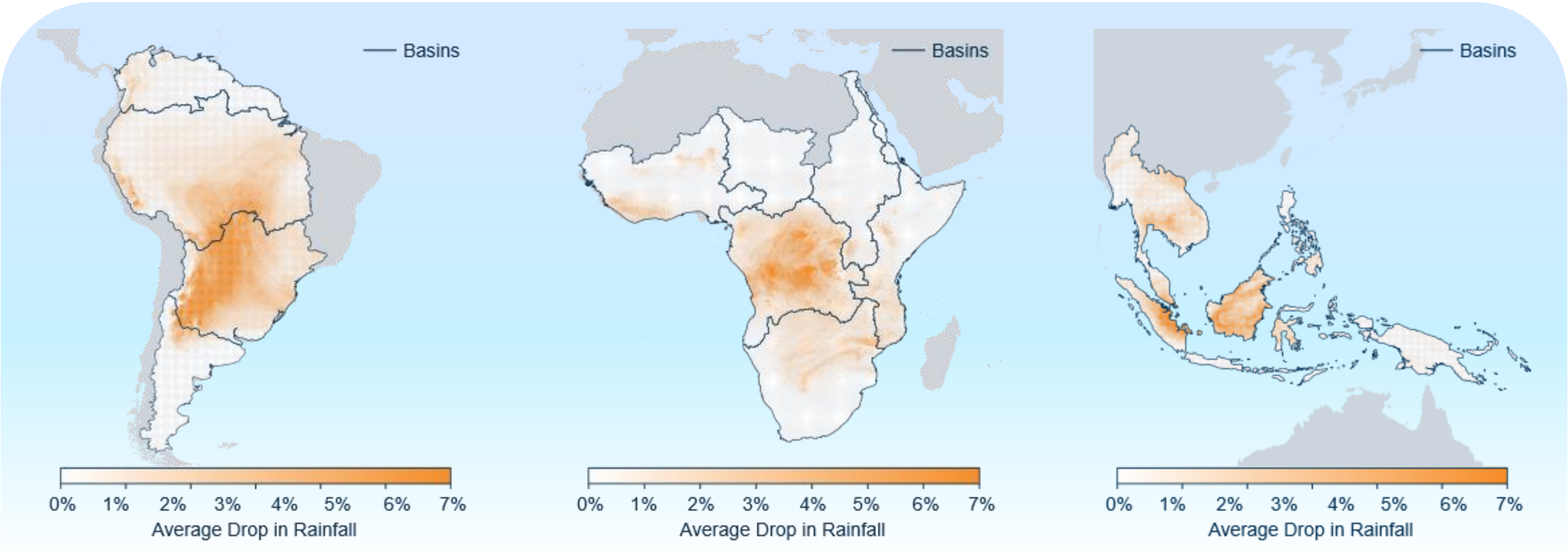
Where does the rest of the 50 percent come from? It comes from a land to land connection.

Nearly 50 percent of all rainfall originates from vegetation on land, and most of it is driven by forests. Wind goes over a forest, clouds form and it deposits rainfall. It can deposit rainfall sometimes many distances away!

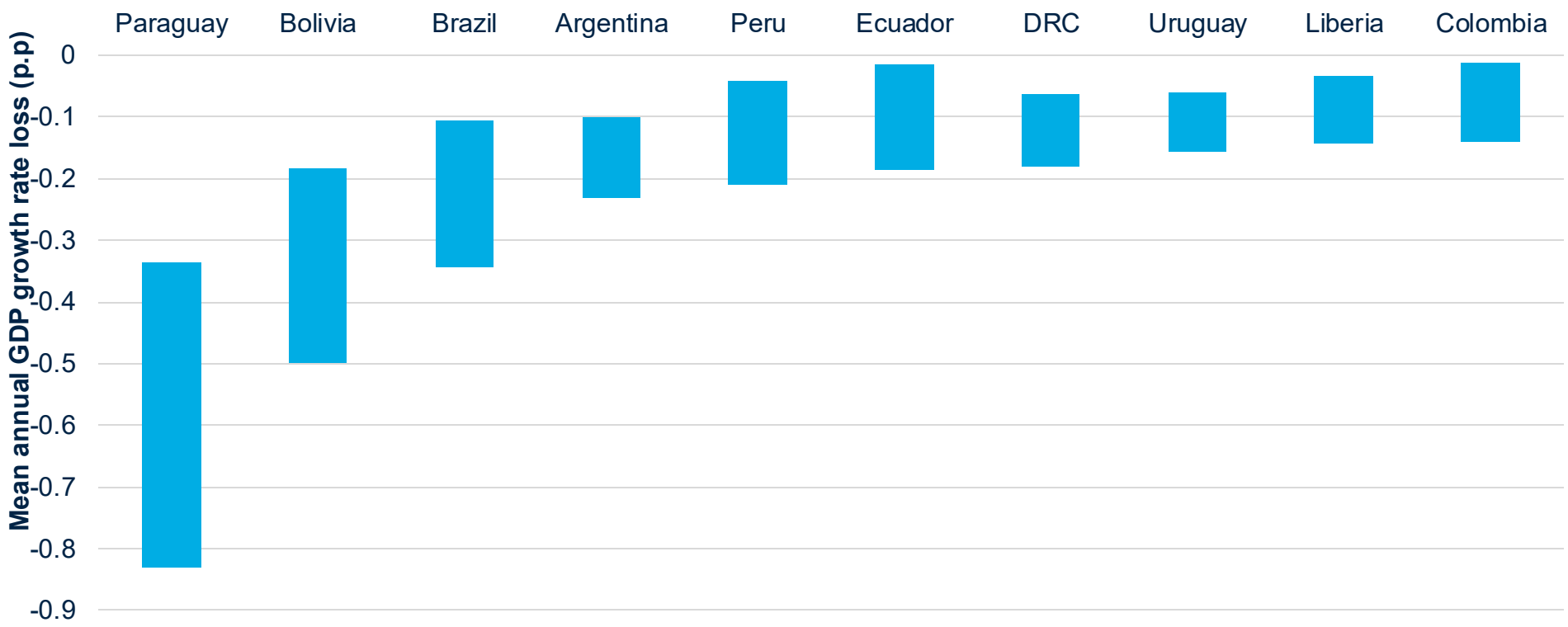
But forests are falling- What does that mean?

- That means have a loss of rainfall. Map shows loss in rainfall in various regions due to forest loss

Rainfall loss due to deforestation (2001 – 2020)



Upwind deforestation -> rainfall loss -> growth loss



GDP losses ≈ $14bn per year – mainly in LAC

Forests nurture the hidden stocks of soil moisture, vital for food production

Once the rain falls, where does it go?

You might think it goes in dams, river, etc. And indeed it does.

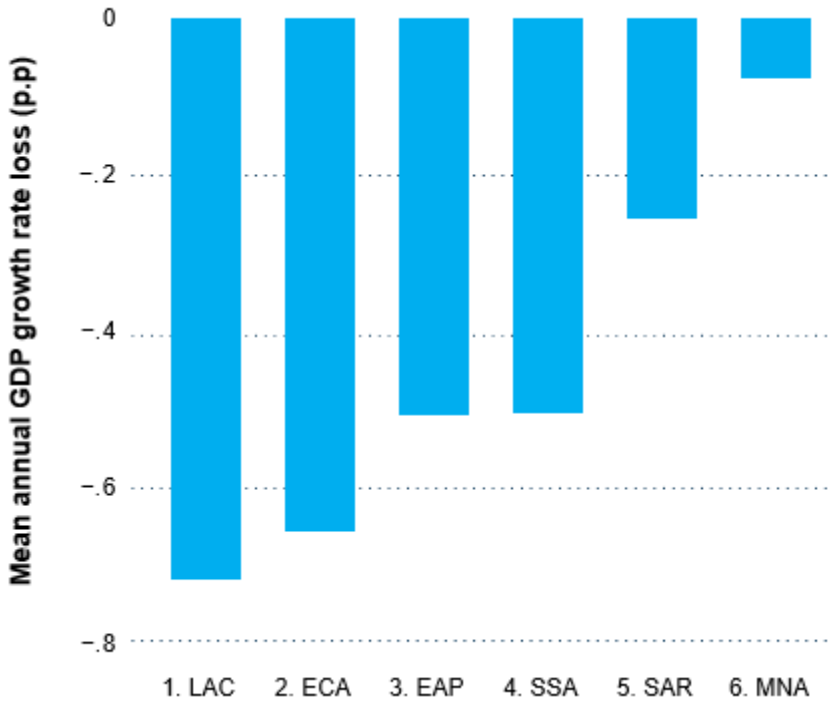
But what you may not know is that 65% of our rain is in soil as soil moisture. And the rest is held in rivers, lakes, groundwater, glaciers and ice. This soil moisture is vital for food production.

Majority of the food we eat comes from this soil moisture.
Why do forests matter for soil moisture?
It turns out, forests do more than generate rain; through their roots and canopy, forests also slow rainfall and allow it to seep into the soil, storing it locally. This hidden reservoir of “soil moisture”, is thus, nurtured by forests

Loss of forests dries out soils and reduces crop yields, costing the world $379 Billion in GDP in Developing Countries

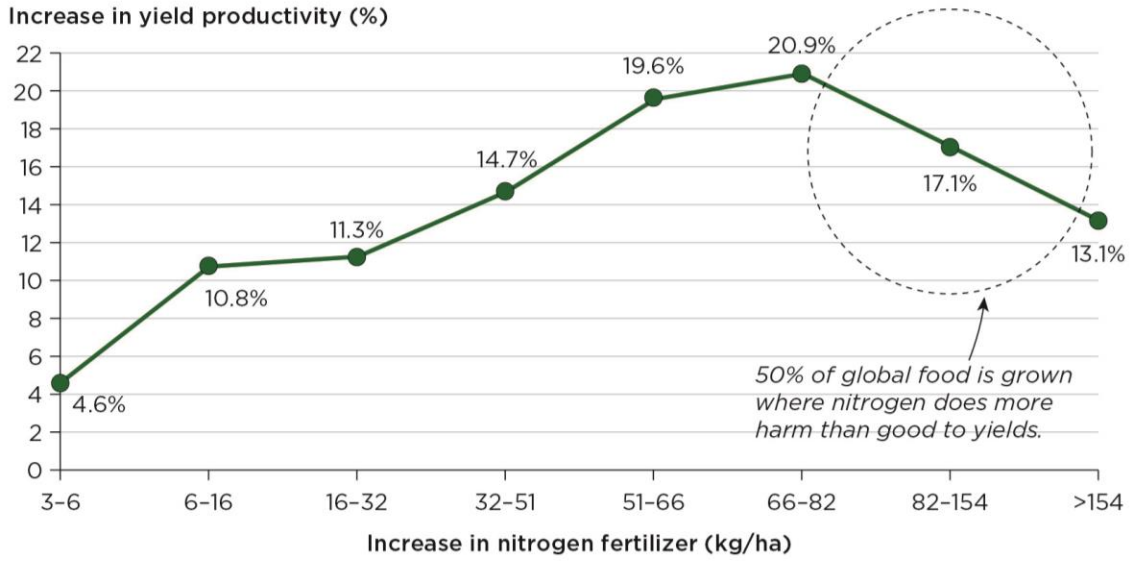
- But when forests are lost, soil moisture declines, amplifying the effects of drought and triggering economic losses.

- The loss of soil moisture due to deforestation costs the world around US$370 billion per year in lost economic growth, equivalent to nearly 8 percent of global agricultural GDP.

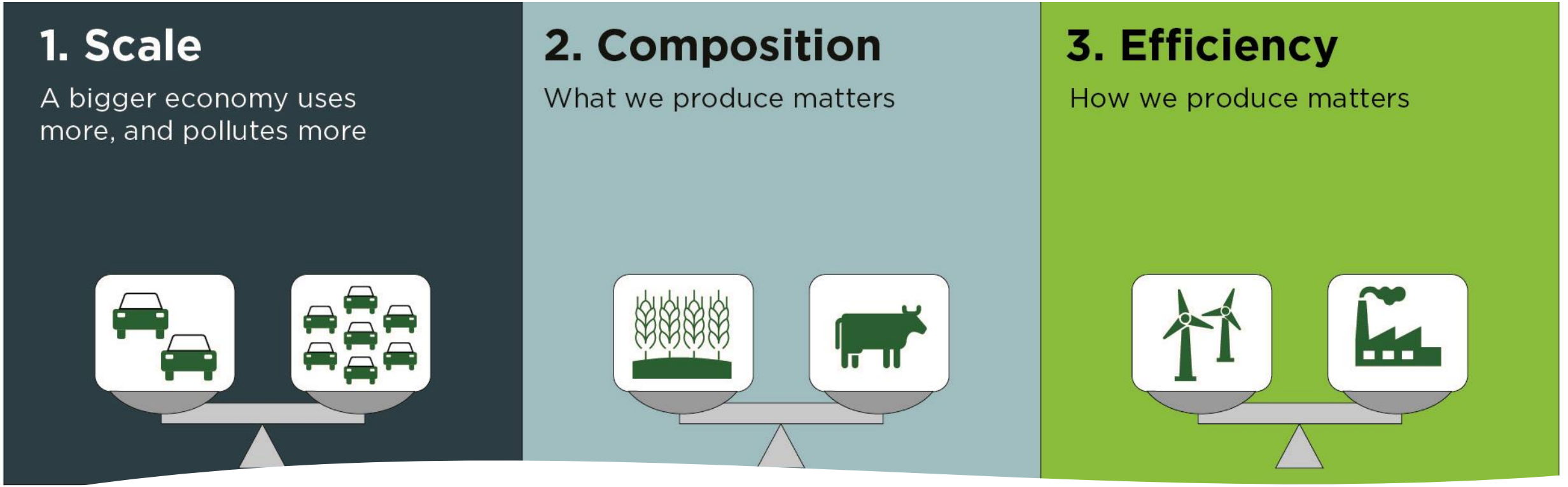


The Nitrogen Leakage Problem: Half of Fertilizer Nitrogen is Lost to the Environment

- Nitrogen balances vary dramatically across the world, ranging from acute deficiencies in some regions to excesses in others.
- Today, in some parts of the world, excessive nitrogen fertilizer use has actually diminished yields. Indeed, Half of the global food supply is grown where nitrogen does more harm than good to yields.
  But in other countries, the challenge is different. Limited access and untargeted use mean fertilizers aren't delivering their full potential, such as in much of Africa.
- Too often, support comes through blanket recommendations, without soil testing or extension services.



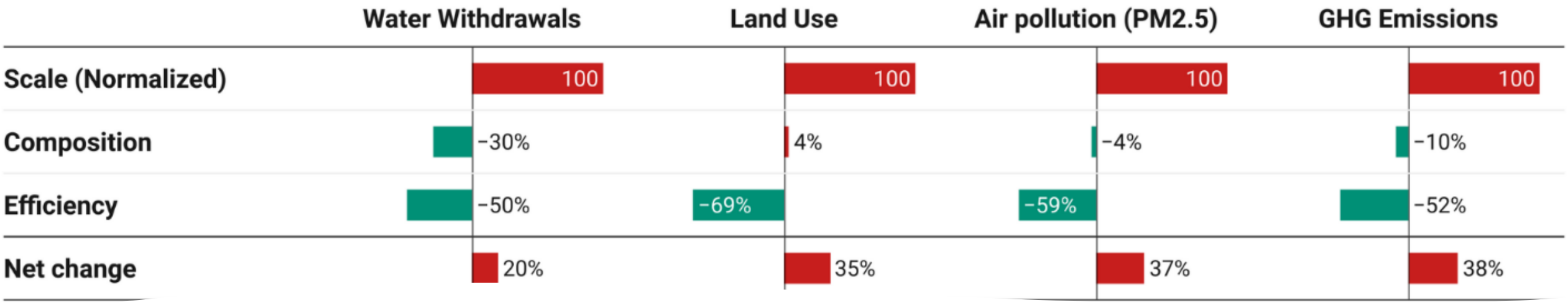
- **Excess nitrogen pollutes land, air, and water—costing up to $3.4 trillion a year globally**
- **Half of the global food supply is grown where nitrogen does more harm than good to yields**



Reboot Development:

Decoupling economic growth from environmental degradation

- Is It possible to decouple economic growth from environmental damage? A decomposition approach can help us think about this:
  - In general (all else equal) as an economy grows it pollutes more and uses more resources. This is called the **scale effect.**
  - But with growth will also come a change in what is produced and consumed – this is the **composition effect**. For instance, it is possible that wealthier economies produce more (or less) polluting goods and consume more water intensive foods.
  - Finally, the efficiency of production matters – producing more with less can offset some of the scale effects. In fact, the **efficiency effect** has mitigated most of the environmental damage.



Decomposition of Environment Footprints

The figure illustrates three key drivers of environmental change—scale, composition, and efficiency—across land, air, water, and GHG emissions.

- **Scale effects** are normalized to show how composition and efficiency can either offset or amplify the environmental impact of growth.
- As shown, **composition effects** play a limited role in mitigating environmental degradation and, in the case of land use change, even exacerbate it.
- In contrast, **efficiency improvements emerge as the main factor reducing the environmental impacts** associated with economic expansion across all domains.

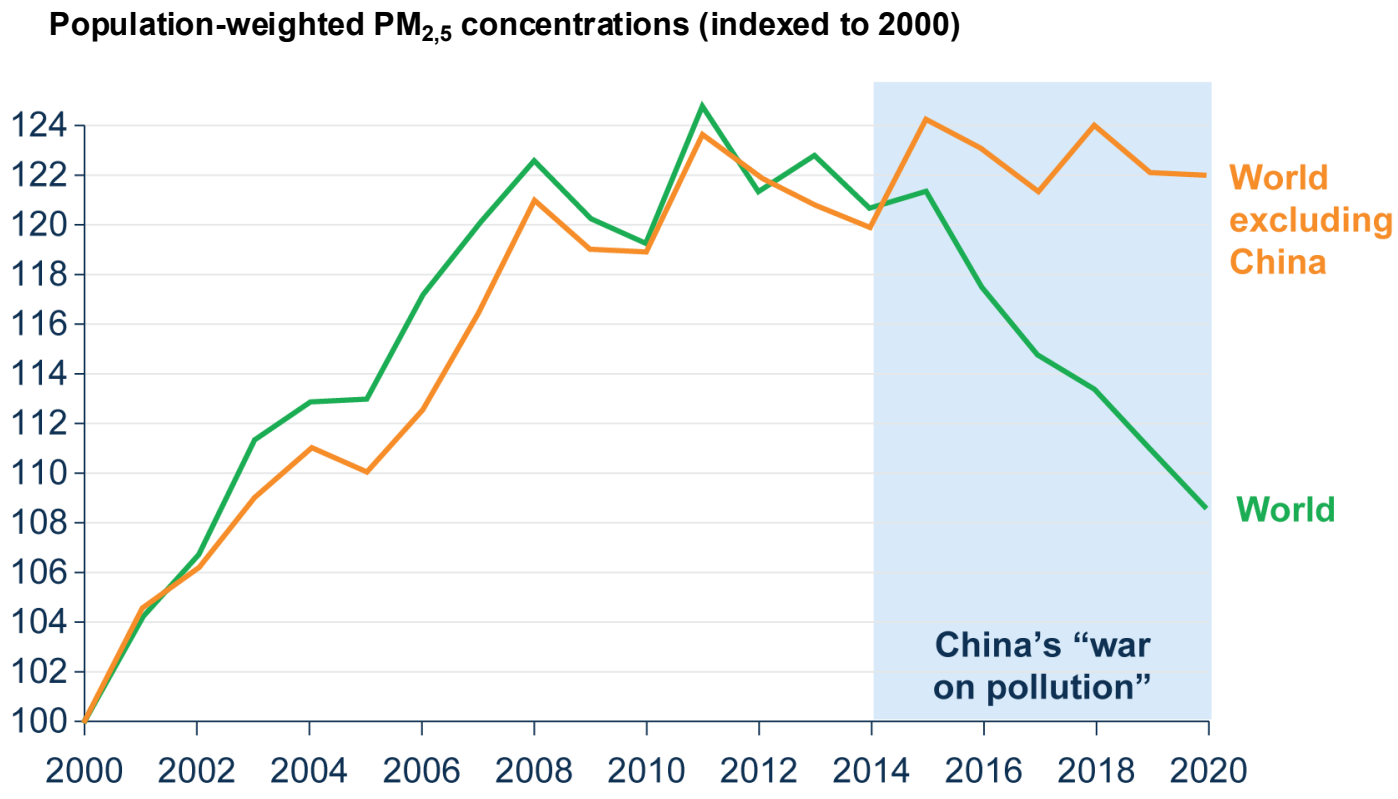
✓ This highlights the crucial role played by technological advancements, process improvements, and better resource management in decoupling economic growth from environmental degradation.

Air Pollution Exposure

It is possible to reduce air pollution ($PM_{2.5}$) while growing the economy

Air pollution is a ubiquitous problem and is especially severe in low- and middle- income countries.

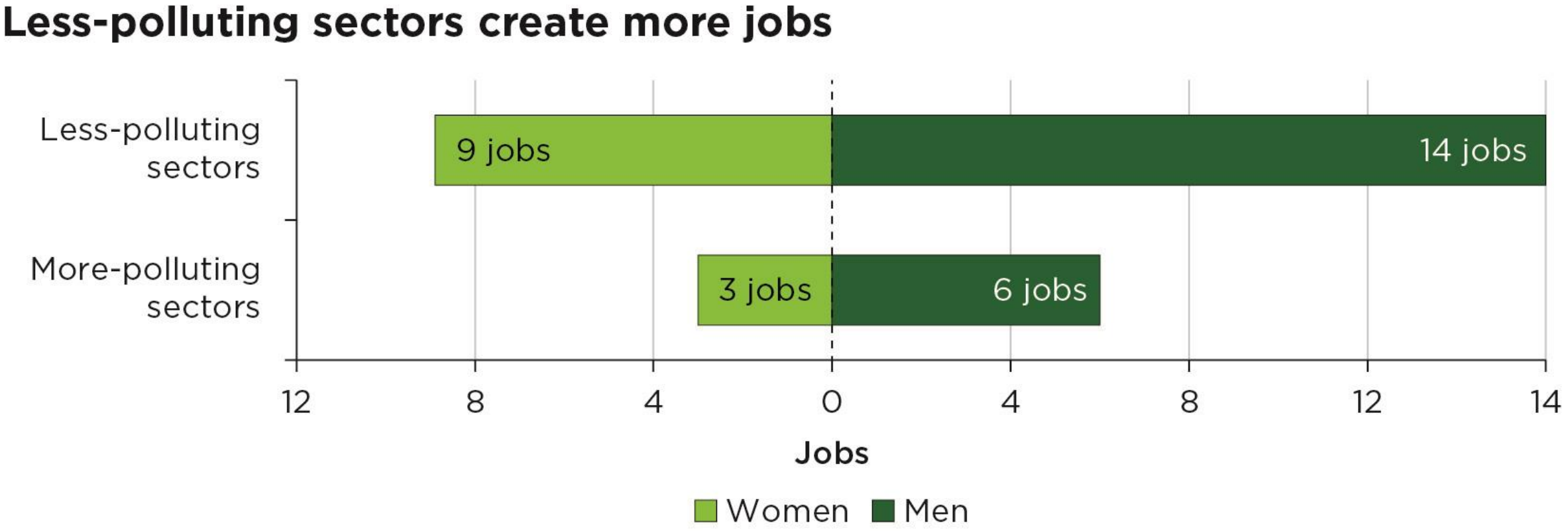
- *Outdoor air pollution kills at least 5.7 million people each year*—more than tobacco, malnutrition, or lives lost to wars and violence. Polluted air reduces productivity, increases sick days, and even lowers cognitive function and, as a consequence, significantly lowers GDP growth in affected regions (World Bank 2025).
- ✓ *China's "war on pollution" proves that change is possible.* In just a decade, many of the country's most polluted cities transformed their air quality through a strategy that included robust monitoring, incentivizing cleaner energy, and enforcing stricter emissions standards. China's success has been responsible for bending the global air pollution curve downward.



Jobs for $1million invested

- *Investment in less-polluting sectors* on average can create *more jobs per dollar invested* compared to more-polluting ones.

➢ The shift toward a cleaner economy can create new economic opportunities. Investing in less-polluting industries (such as fishing, health, and education) often generates more employment per dollar invested than investing in more polluting sectors. For example, forestry leads the way, generating on average more than 38 jobs per $1 million.



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