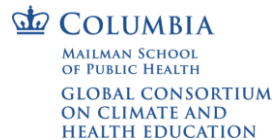


Caribbean Climate and Health Responders Course

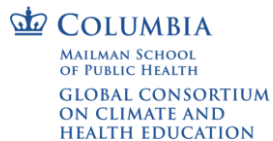
Climate Change and Health Equity

Carlos A. Faerron Guzmán, M.D., M.Sc.

Associate Director, Planetary Health Alliance, Harvard T.H. Chan School of Public Health
Associate Professor, University of Maryland, Graduate School
Visiting Scholar, ISGlobal, Barcelona



Zoom Poll Question 1



Learning Objectives

- Define climate-health vulnerability and climate resilience.
- Identify social and environmental determinants of health that make individuals and communities more vulnerable to climate-related health threats.
- Apply the vulnerability framework to specific populations (women, workers, climate refugees, indigenous people).
- Describe the unique vulnerabilities of the following populations: elderly, children, socioeconomically disadvantaged, homeless, immunocompromised patients, patients with chronic medical conditions/ NCDs.
- Apply knowledge of the ethical, professional, and legal obligations relevant to climate and health.

WORD CLOUD #1



EarthMedic
EarthNurse
Promoting Health of People
and Planet Together



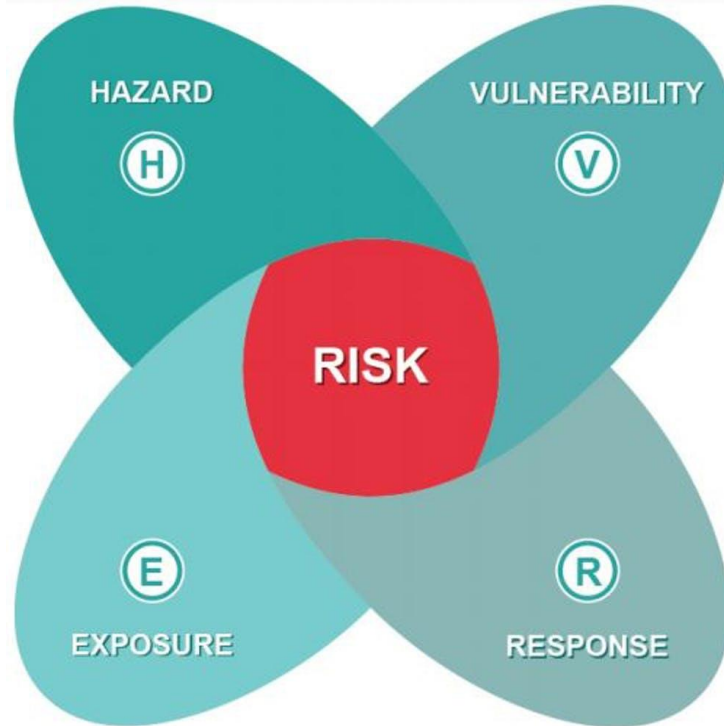
COLUMBIA

MAILMAN SCHOOL
OF PUBLIC HEALTH

GLOBAL CONSORTIUM
ON CLIMATE AND
HEALTH EDUCATION



Understanding Risk



Simpson, N.P., Mach, K.J., Constable, A., Hess, J., Hogarth, R., Howden, M., Lawrence, J., Lempert, R.J., Muccione, V., Mackey, B. and New, M.G., 2021. A framework for complex climate change risk assessment. *One Earth*, 4(4), pp.489-501.

Understanding Risk

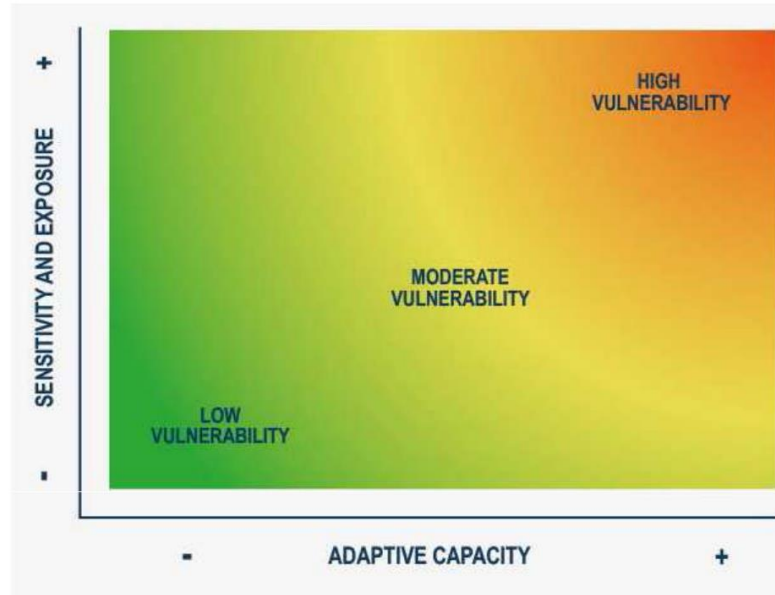
		CONSEQUENCES				
		Negligible	Minor	Moderate	Major	Catastrophic
PROBABILITIES	Almost certain					HIGH RISK
	Likely					
	Unlikely					
	Rare	LOW RISK				

IPCC Sixth Assessment Report

[Climate Change 2022: Impacts, Adaptation and Vulnerability](#)

Understanding Vulnerability

Understanding Vulnerability



http://www.lifeseCADapt.eu/fileadmin/user_upload/ALLEGATI_LIFESECAD_APT/documenti/Vulnerability_Risk_FGiordano.pdf

Understanding Resilience

Health and Climate – many models...

Figure ES2: Climate Change and Health

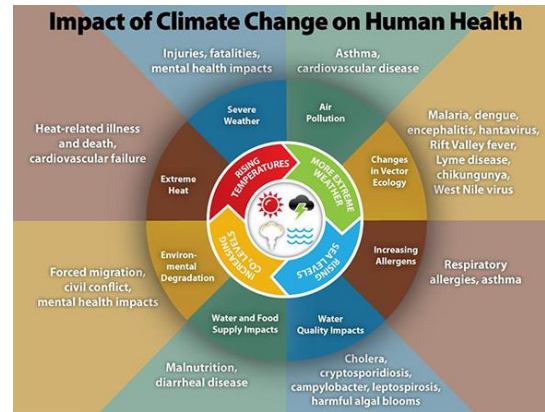
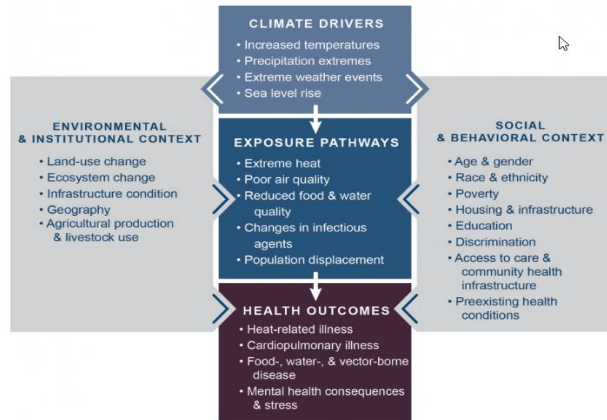
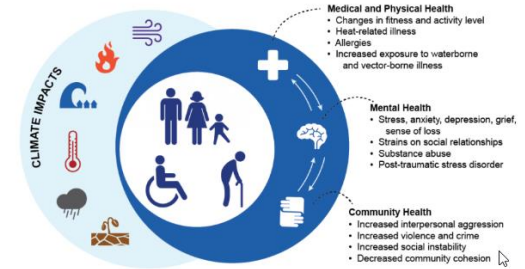


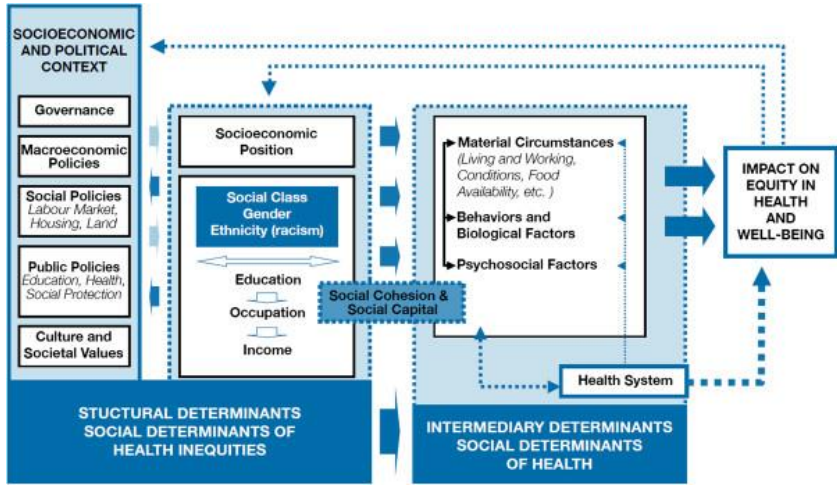
Figure 8.2: Impact of Climate Change on Physical, Mental, and Community Health



Source: USGCRP 2016

[National Center for Environmental Health](https://www.nceh.nih.gov/)

Crimmins et al. 2016



Commission on Social determinants of Health WHO 2008



Dahlgren and Whitehead 1991

DETERMINANTS OF HEALTH

Macro-economic context
Policy environment
Governance mechanisms
Education
Cultural context
Access to justice
Health systems

Labor conditions
Food production
Land use
Access to fresh water
Air quality
Infectious disease
exposure

Socioeconomic status
Social capital
Ethnicity/Race
Behavior/personal choices
Gender
Constitutional factors

Interacting amongst
each other simultaneously



Health (disease)
as a dynamic
product of an
eco-social
system

Climate Change is a threat multiplier

CLIMATE CHANGE

- Increasing temperatures
- Precipitation Extremes (floods, droughts)
- Extreme weather events
- Sea level rise
- Biodiversity loss
- Ecosystem and land use changes
- Wetlands and coral reef loss
- Desertification
- Land degradation
- Water contamination
- Altered biogeochemical cycles

As a threat multiplier



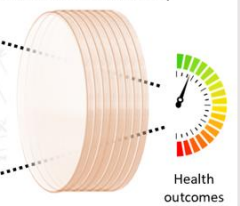
UNDERLYING DRIVING FACTORS

- Consumption patterns
- Production systems
- Demographic changes
- State of technology

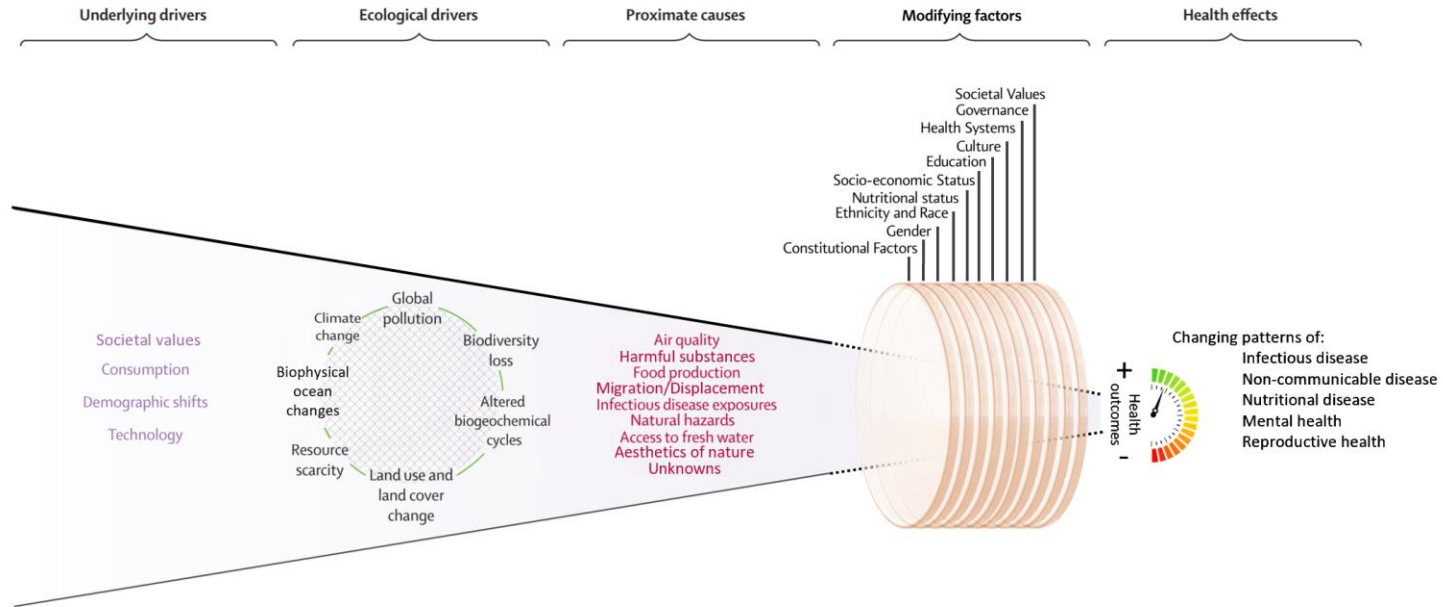
DETERMINANTS OF HEALTH

- | | | |
|------------------------|-----------------------------|---------------------------|
| Macro-economic context | Labor conditions | Socioeconomic status |
| Policy environment | Food production | Social capital |
| Governance mechanisms | Land use | Ethnicity/Race |
| Education | Access to fresh water | Behavior/personal choices |
| Cultural context | Air quality | Gender |
| Access to justice | Infectious disease exposure | Constitutional factors |
| Health systems | | |

Interacting amongst each other simultaneously



Climate change does not happen in a vacuum



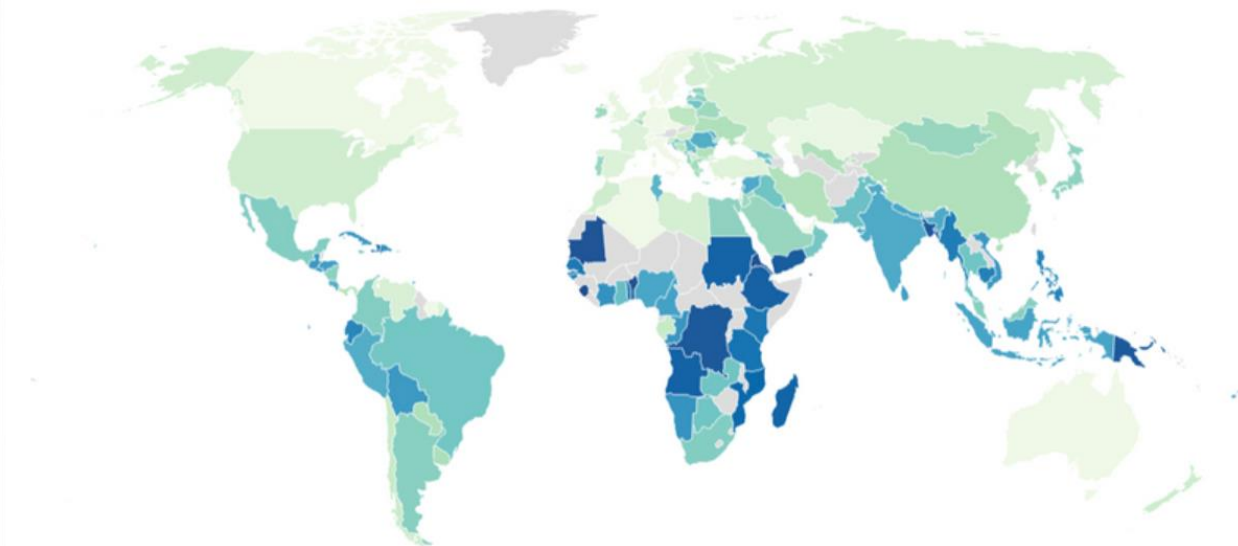
Schematic illustrating impacts of anthropogenic change on human health

(modified by Faerron Guzman from Myers, S.S., 2017. Planetary health: protecting human health on a rapidly changing planet. *The Lancet*, 390(10114), pp.2860-2868.)

The countries most vulnerable amid climate change

Scientists assessed countries' vulnerability based on food security, water availability, human health and living conditions, ecosystem services and infrastructure, including energy. The most vulnerable are in sub-Saharan Africa, South Asia and small island states.

Vulnerability index score



Vulnerability rises with higher scores. Data not available for regions in gray.

Map: The Conversation/CC-BY-ND • Source: Edmonds, Lovell and Lovell, 2020

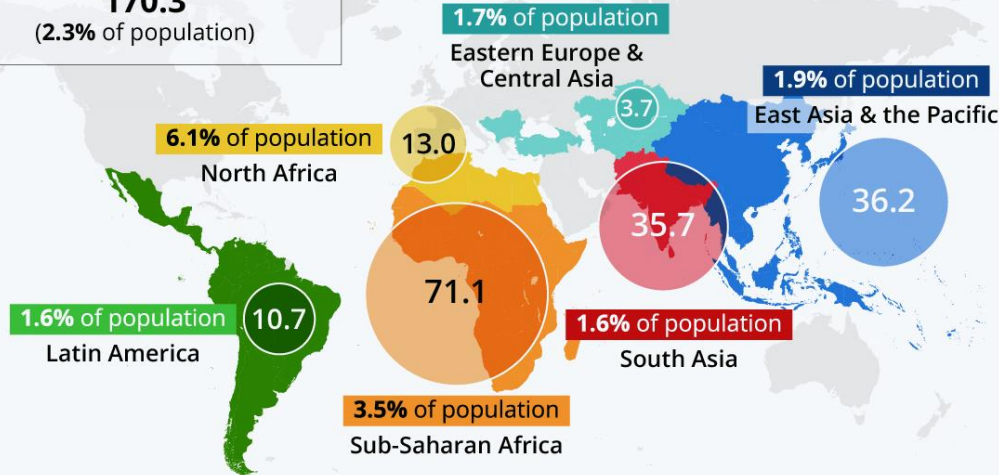
Climate Change, the Great Displacer



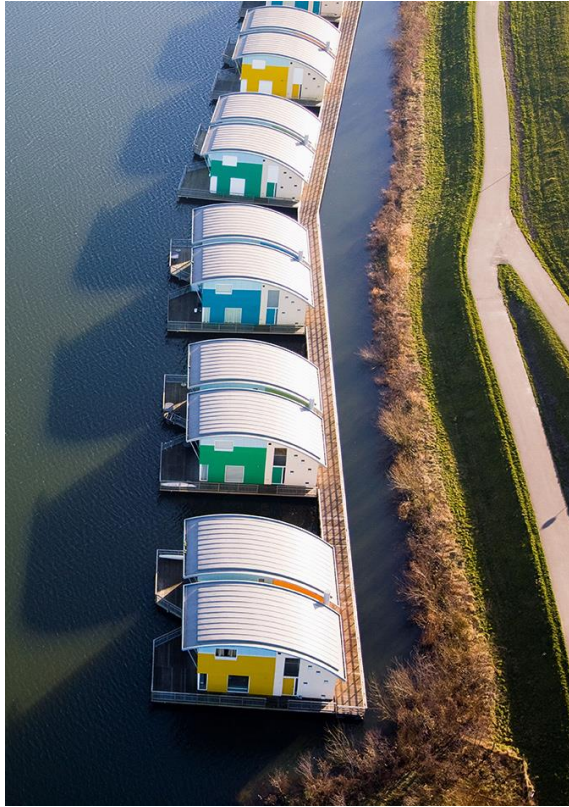
Average number of internal climate migrants
by 2050 per region (in millions)*

Total in surveyed regions

170.3
(2.3% of population)



* Modeled on pessimistic reference = High emission & unequal development scenarios concerning water availability, crop productivity and sea-level rise
Source: World Bank



Crops grown in open field conditions with elevated CO² = lower amounts of iron, zinc, and protein

- 150-200 million people are expected to be pushed into zinc deficiency

Climate change

Climate change making food crops less nutritious, research finds

High CO₂ levels significantly reduces essential nutrients in wheat, rice, maize and soybeans, Nature paper reveals

Damian Carrington
@dpcarrington
Wed 7 May 2014 13:03 EDT

f t e ...

This article is over 3 years old

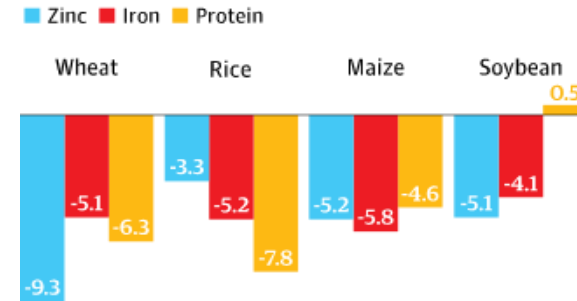
< 1,052 192



▲ Bangladeshi farmers harvest rice in a field on the outskirts of Dhaka. Photograph: Munir Uz Zaman/AFP/Getty Images

High CO₂ cuts crop nutrients

Percentage under CO₂ levels expected in 2050,



SOURCE: NATURE

IMPACTS OF CLIMATE CHANGE

By **2030**, nine out of 10 of the major crops will experience reduced or stagnant growth rates, while average prices will increase dramatically as a result, at least in part, due to climate change.



MAIZE

12%

GROWTH RATE
DECREASE

90%
PRICE
INCREASE



RICE

23%

GROWTH RATE
DECREASE

89%
PRICE
INCREASE



WHEAT

13%

GROWTH RATE
DECREASE

75%
PRICE
INCREASE



OTHER CROPS

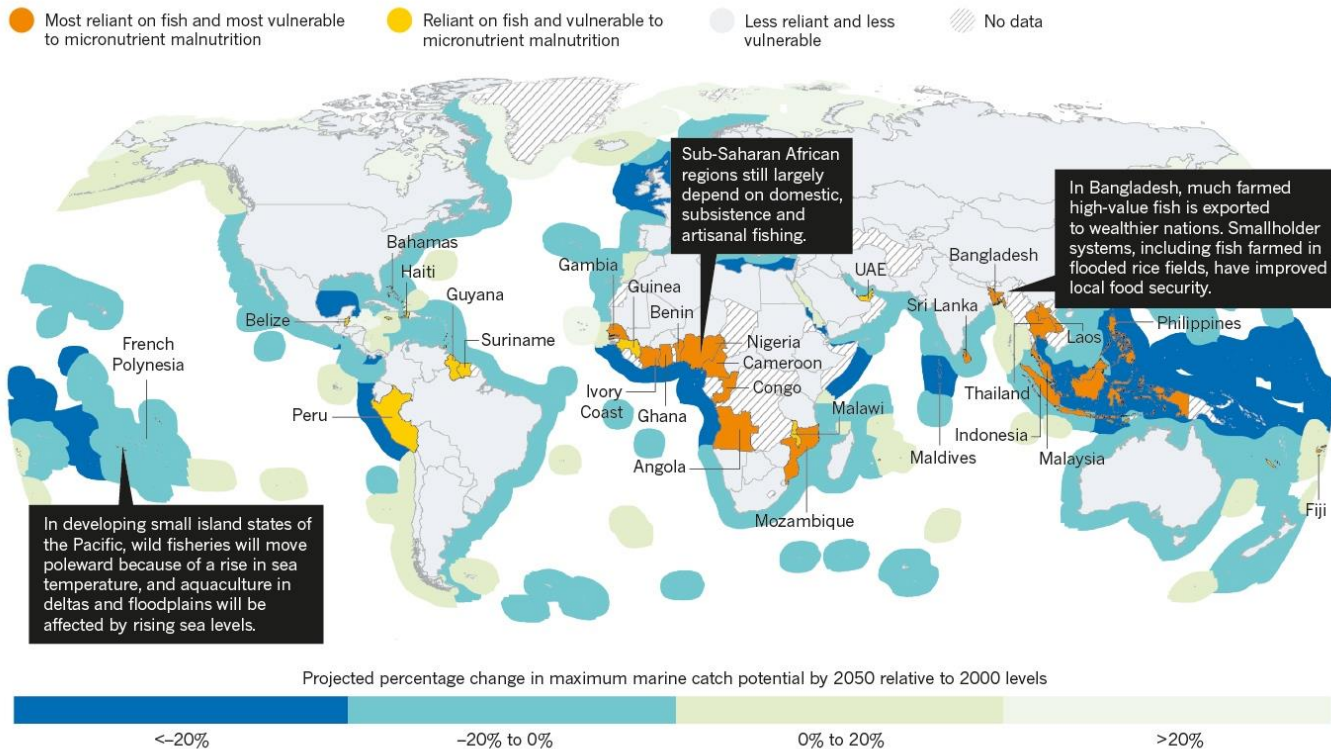
8%

GROWTH RATE
DECREASE

83%
PRICE
INCREASE

TROUBLED WATERS

In the low-latitude developing nations, human nutrition is most dependent on wild fish, and fisheries are most at risk from illegal fishing, weak governance, poor knowledge of stock status, population pressures and climate change. These countries urgently need effective strategies for marine conservation and fisheries management to rebuild stocks for nutritional security.



Who bears responsibility for carbon emissions growth?

From 1990 to 2015, the wealthiest 5% of the global population were responsible for 36% of global emissions growth, an analysis by Stockholm Environment Institute and Oxfam found. Together, the wealthiest 10% accounted for almost half of the emissions growth.

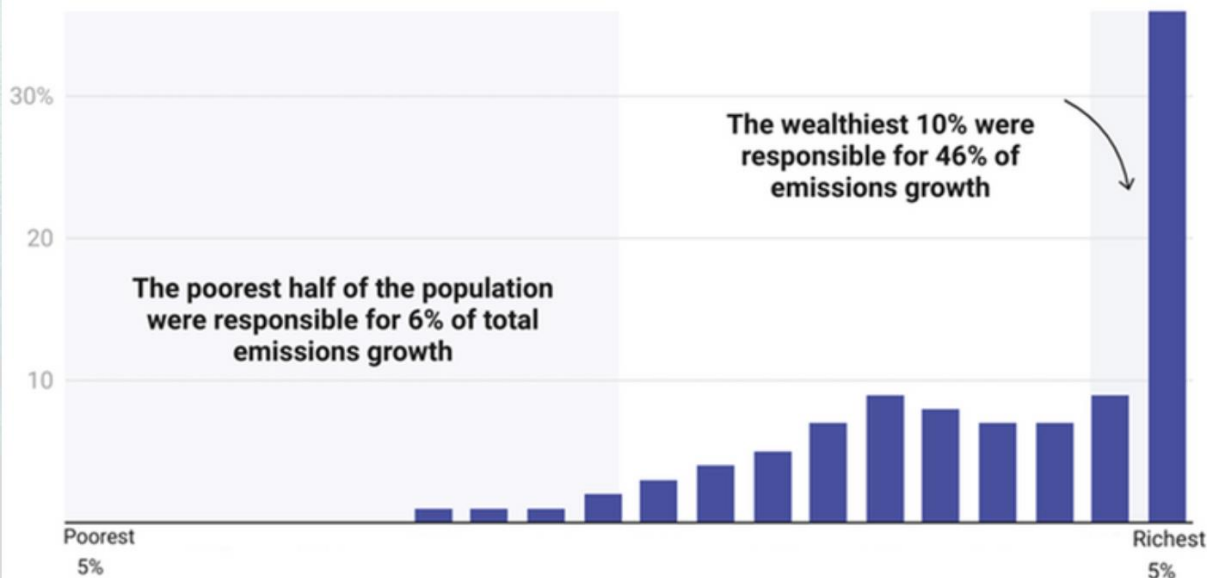


Chart: The Conversation/CC-BY-ND • Source: Stockholm Environment Institute and Oxfam

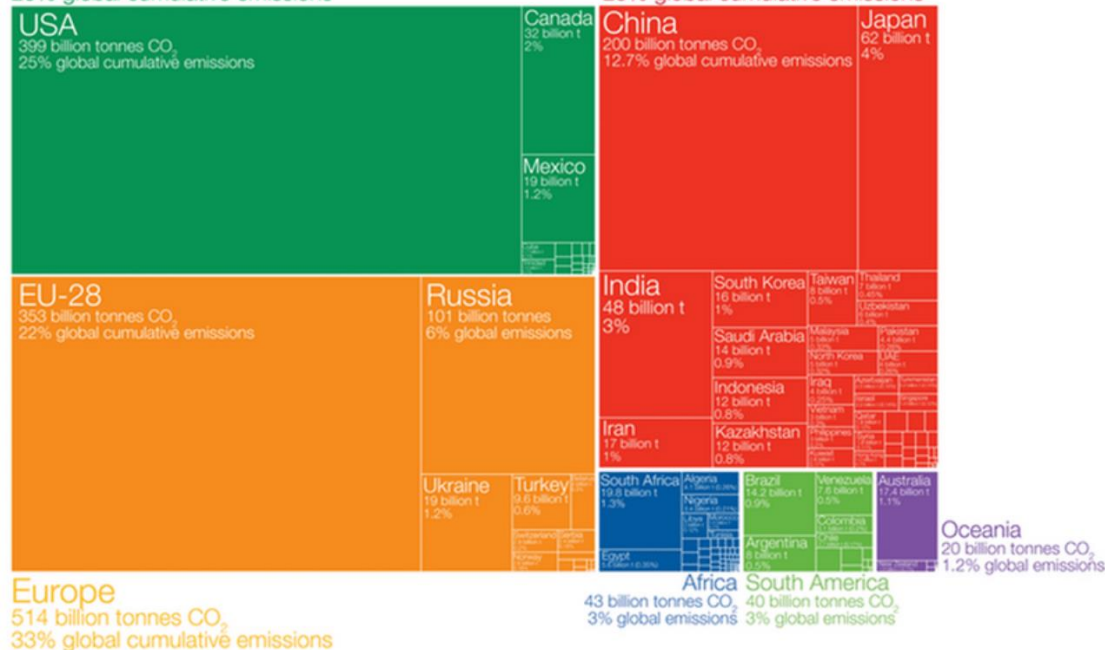
Who has contributed most to global CO₂ emissions?

Our World
in Data

Cumulative carbon dioxide (CO₂) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO₂ produced domestically from fossil fuel combustion and cement, and do not correct for emissions embedded in trade (i.e. consumption-based). Emissions from international travel are not included.

North America

457 billion tonnes CO₂
29% global cumulative emissions



Europe

514 billion tonnes CO₂
33% global cumulative emissions

Figures for the 28 countries in the European Union have been grouped as the "EU-28" since international targets and negotiations are typically set as a collaborative target between EU countries. Values may not sum to 100% due to rounding.

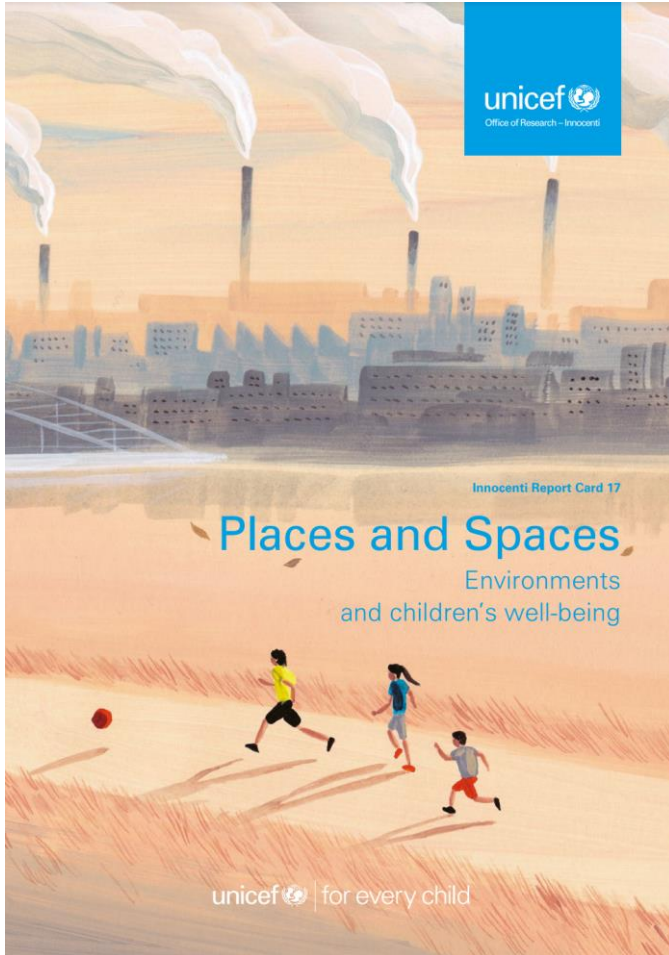
Data source: Calculated by Our World in Data based on data from the Global Carbon Project (GCP) and Carbon Dioxide Analysis Center (CDIAC).

This is a visualization from [OurWorldinData.org](https://ourworldindata.org), where you find data and research on how the world is changing.

Licensed under CC-BY by the author Hannah Ritchie.



From Patz JA, Gibbs HK, Foley JA, et al. Climate change and global health: quantifying a growing ethical crisis. *EcoHealth*. 2007; doi:10.1007/s10393-007-0141-1

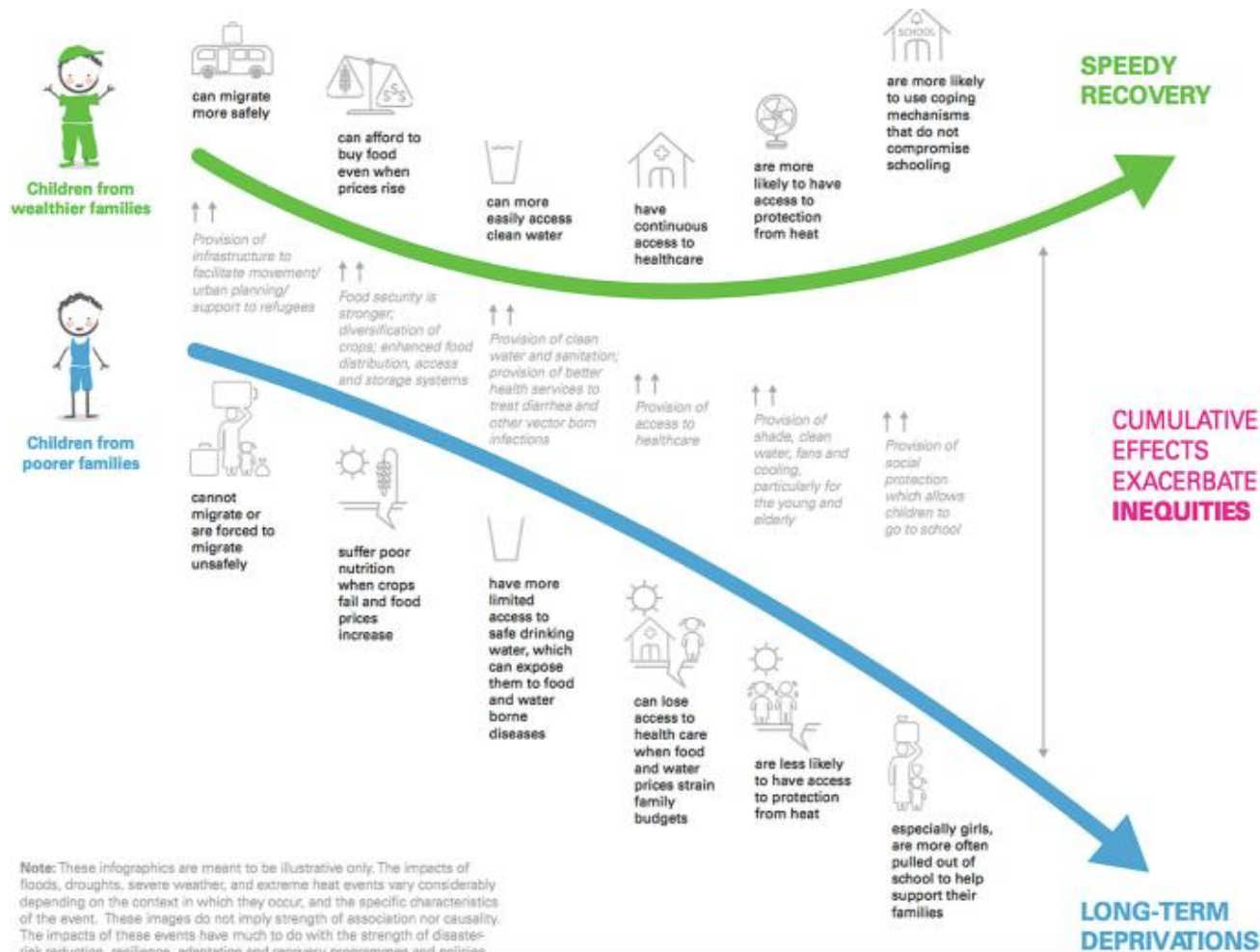


Gunilla Olsson, Director of UNICEF Office of Research –

“

In some cases we are seeing countries providing relatively healthy environments for children at home while being among the top contributors to pollutants that are destroying children's environments abroad.

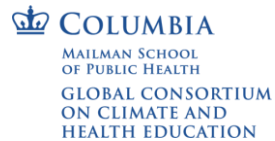
”

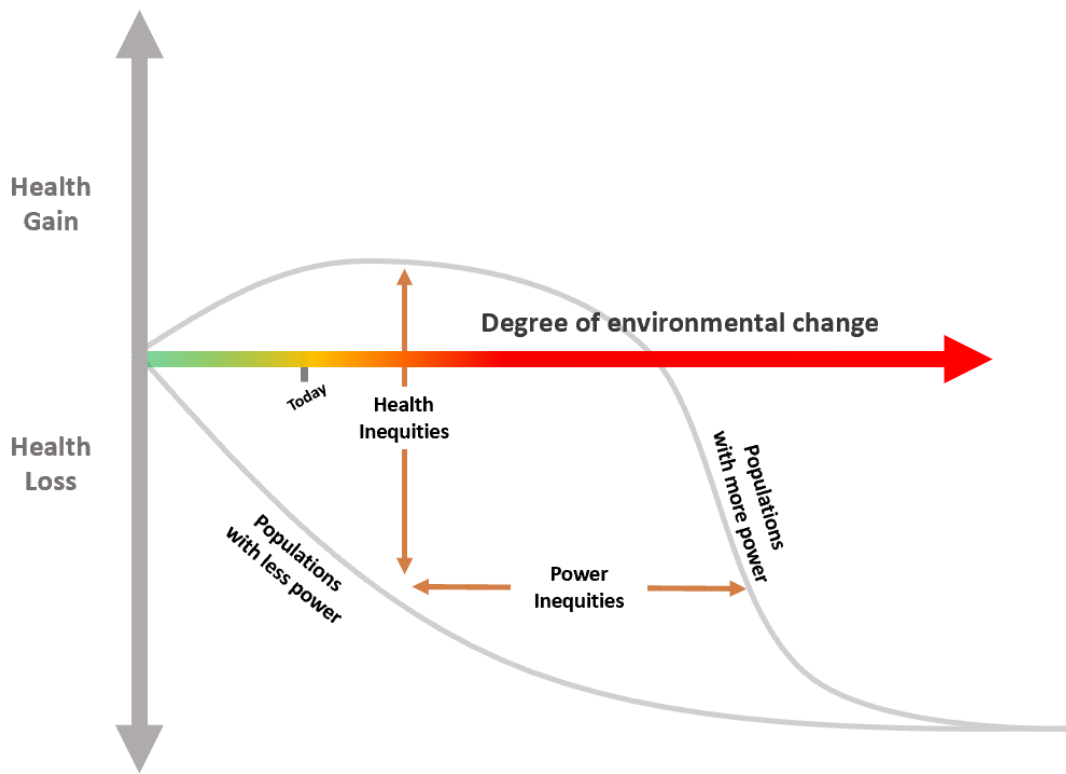


Note: These infographics are meant to be illustrative only. The impacts of floods, droughts, severe weather, and extreme heat events vary considerably depending on the context in which they occur, and the specific characteristics of the event. These images do not imply strength of association nor causality. The impacts of these events have much to do with the strength of disaster-risk reduction, resilience, adaptation and recovery programmes and policies.

Sanson, A.V. and Burke, S.E., 2020. Climate change and children: An issue of intergenerational justice. In *Children and peace* (pp. 343-362). Springer, Cham.

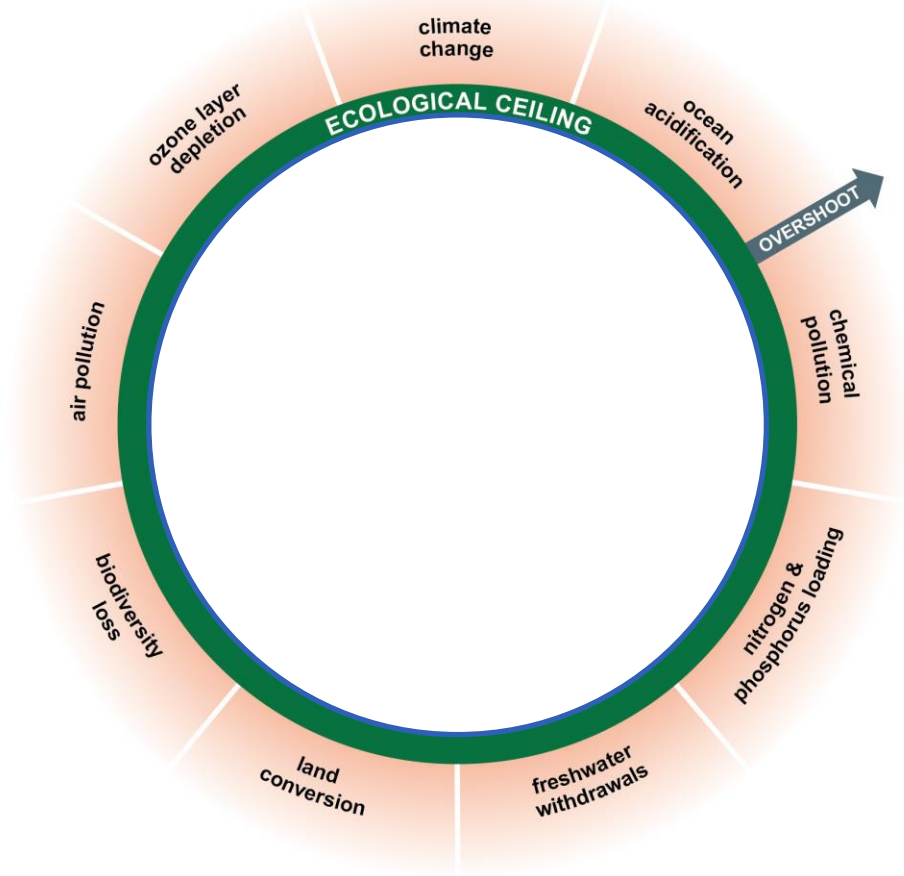
WORD CLOUD #2

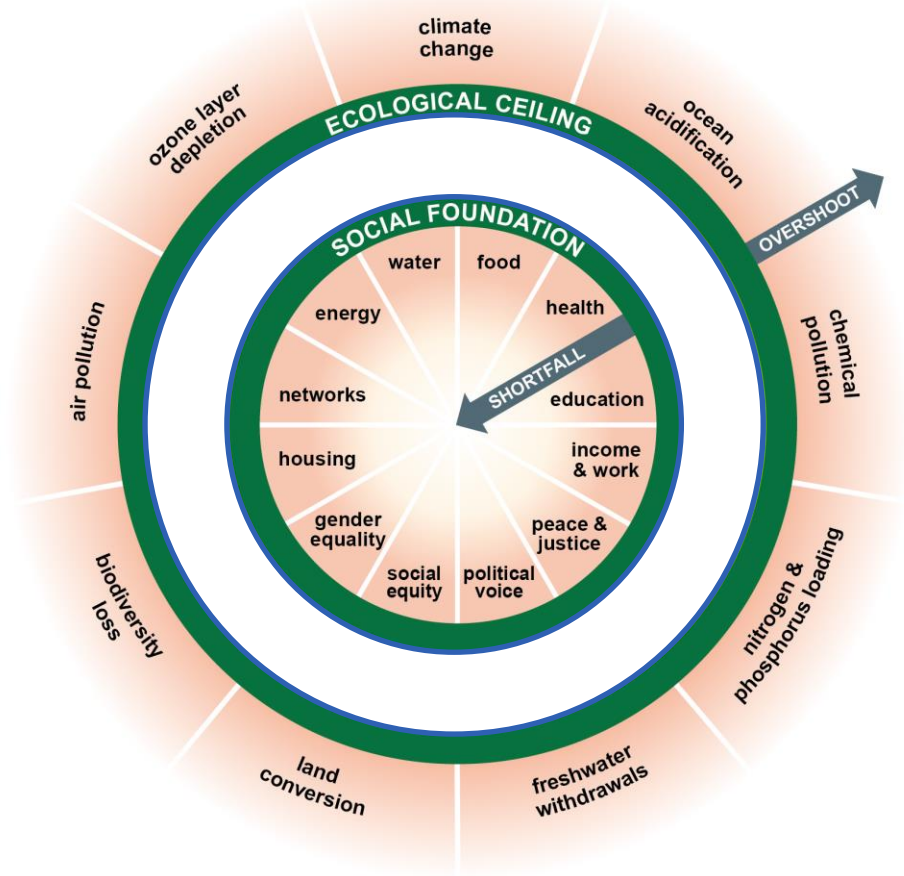


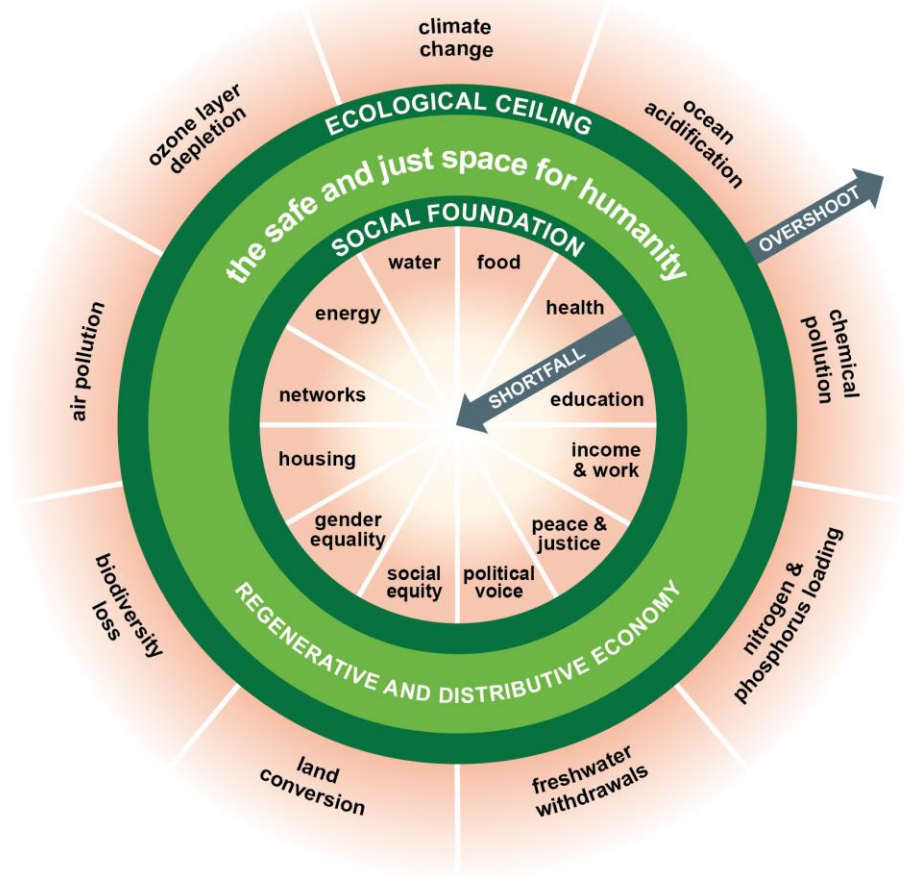


Health Impacts of Anthropogenic Environmental Change – Status quo scenario.

Inequitable health impacts and inequitable power distribution explain the delay to act and inaction from the most powerful in the face of global environmental change.







YOUR ROLE AS A HEALTH PROFESSIONAL

Know your science

Understand the co-benefits of climate action

Get involved with the policy makers

Keep the research (and the funding going)

Mobilize from the base

