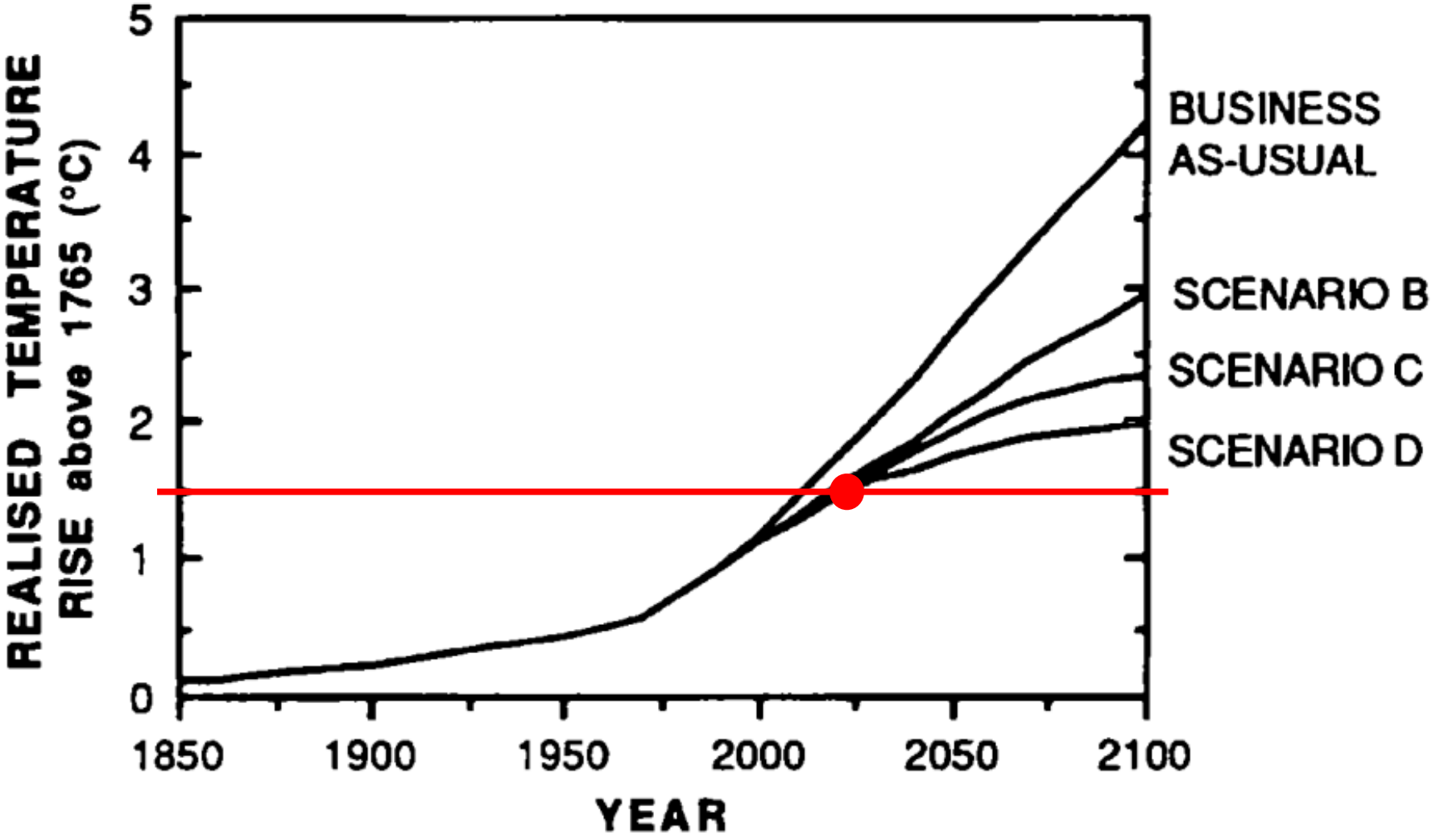
Climate Change and Africa

From understanding the challenges towards implementing solutions

CHAC 2024
Climate and Health Africa Conference

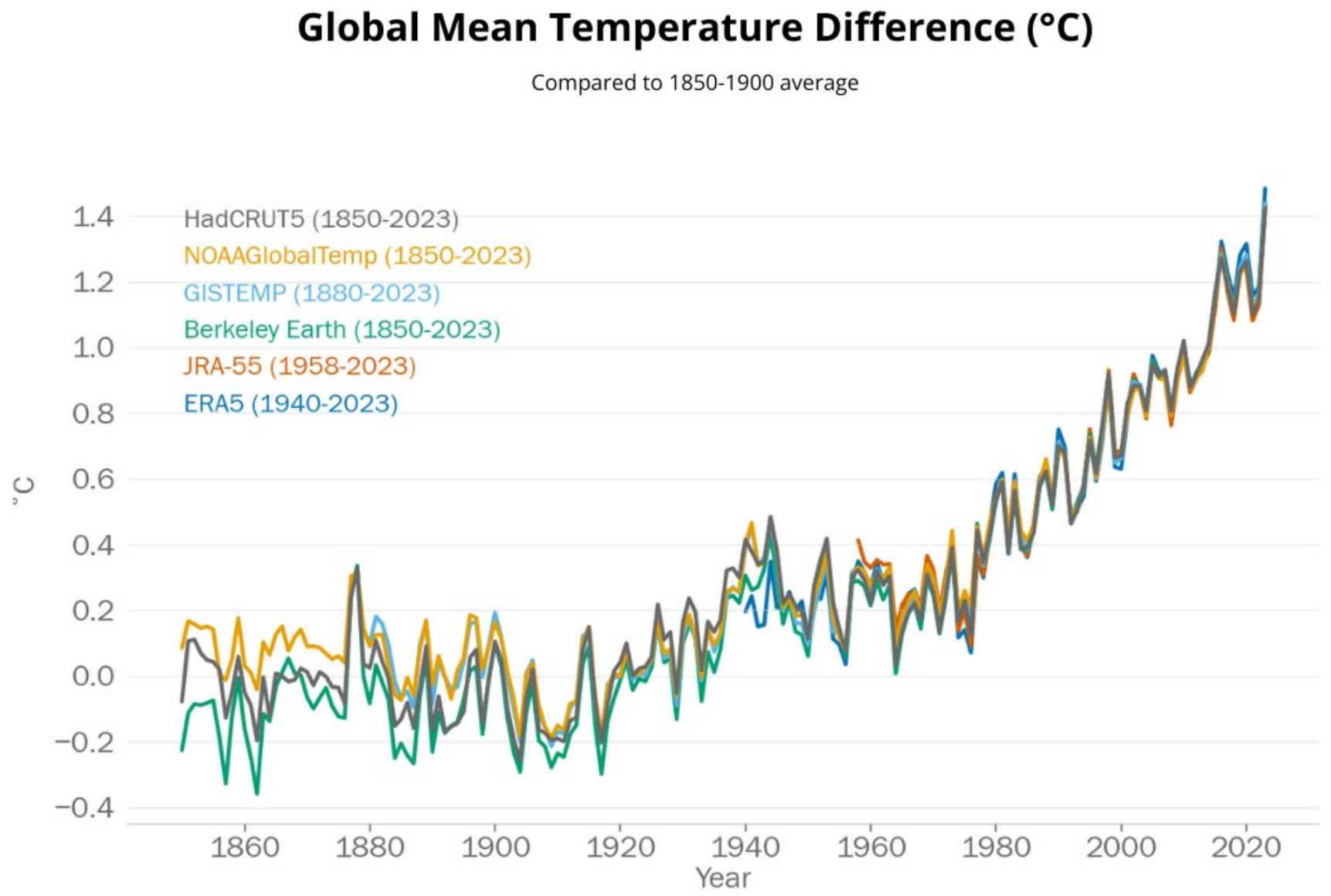
Christopher Jack, University of Cape Town

A bit of climate science history



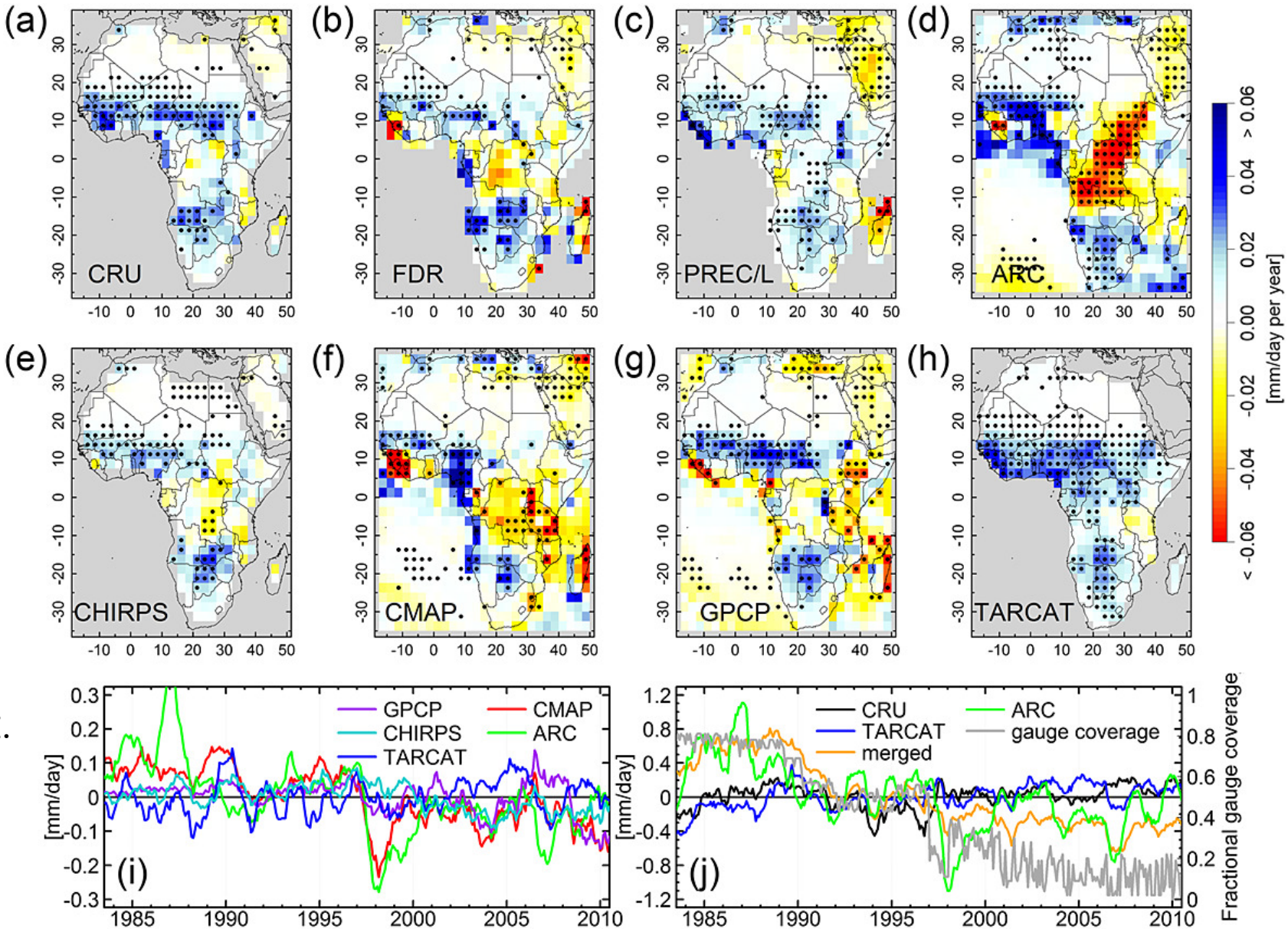
IPCC Scientific assessment of climate change (1990 – 1992)

Reaching 1.5°C warming



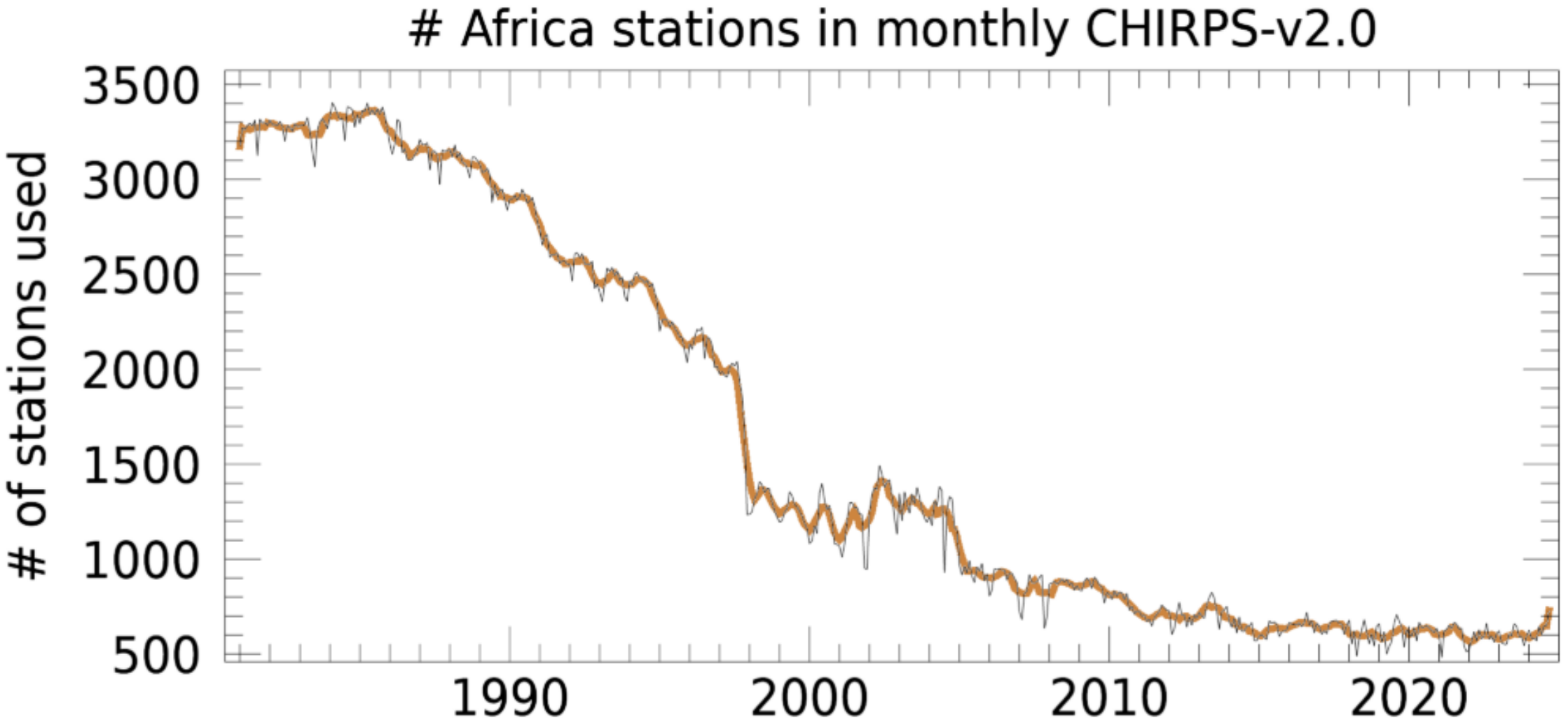
WMO 2023

Quantifying African climate



Maidment, R. I., Allan, R. P., & Black, E. (2015). Recent observed and simulated changes in precipitation over Africa. Geophysical Research Letters, 42(19), 8155-8164.

Quantifying African climate



https://www.chc.ucsb.edu/data/chirps

Attributable changes

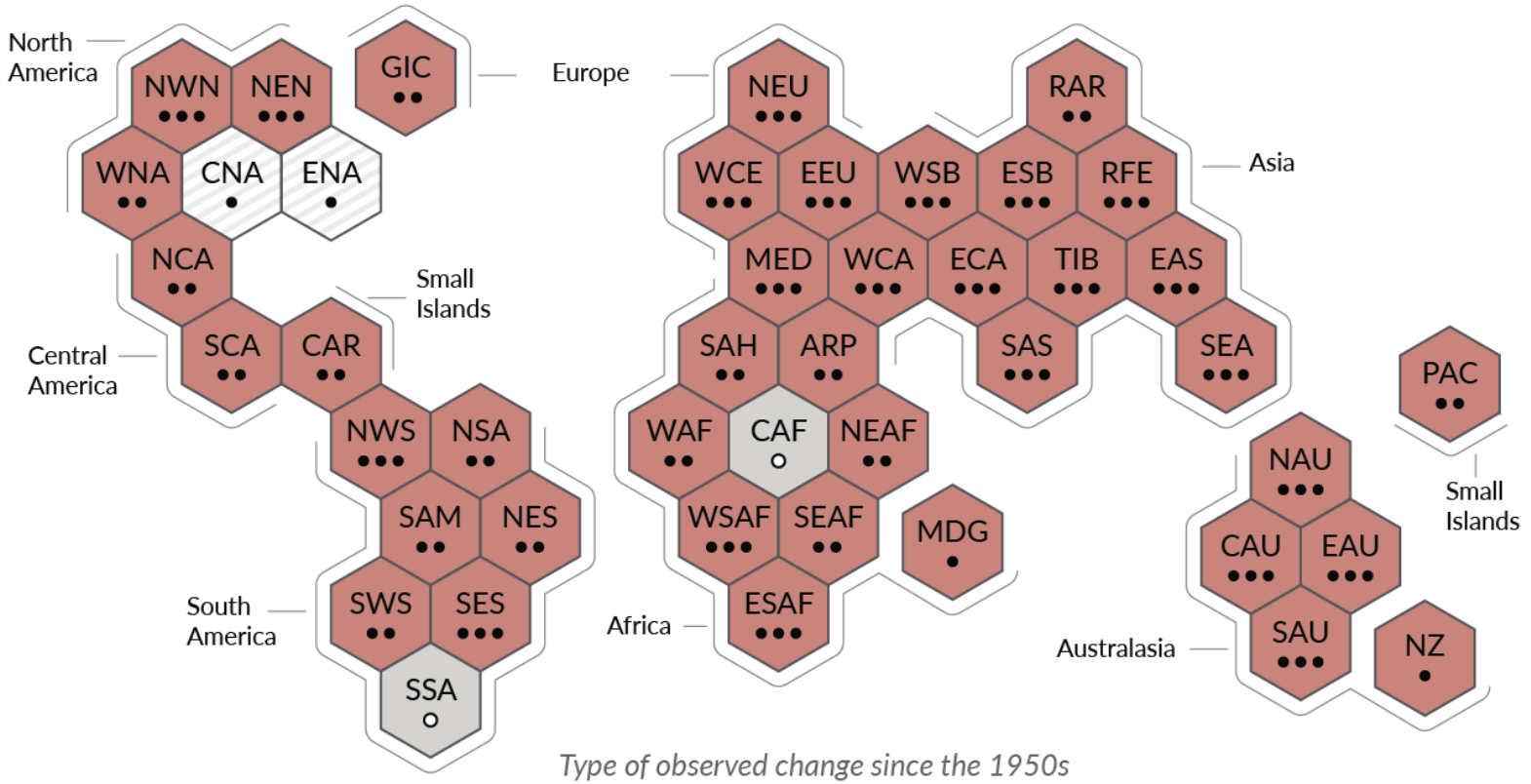
(a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions

Type of observed change
in hot extremes

- Increase (41)
- Decrease (0)
- Low agreement in the type of change (2)
- Limited data and/or literature (2)

Confidence in human contribution
to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



Type of observed change since the 1950s

Attributable changes

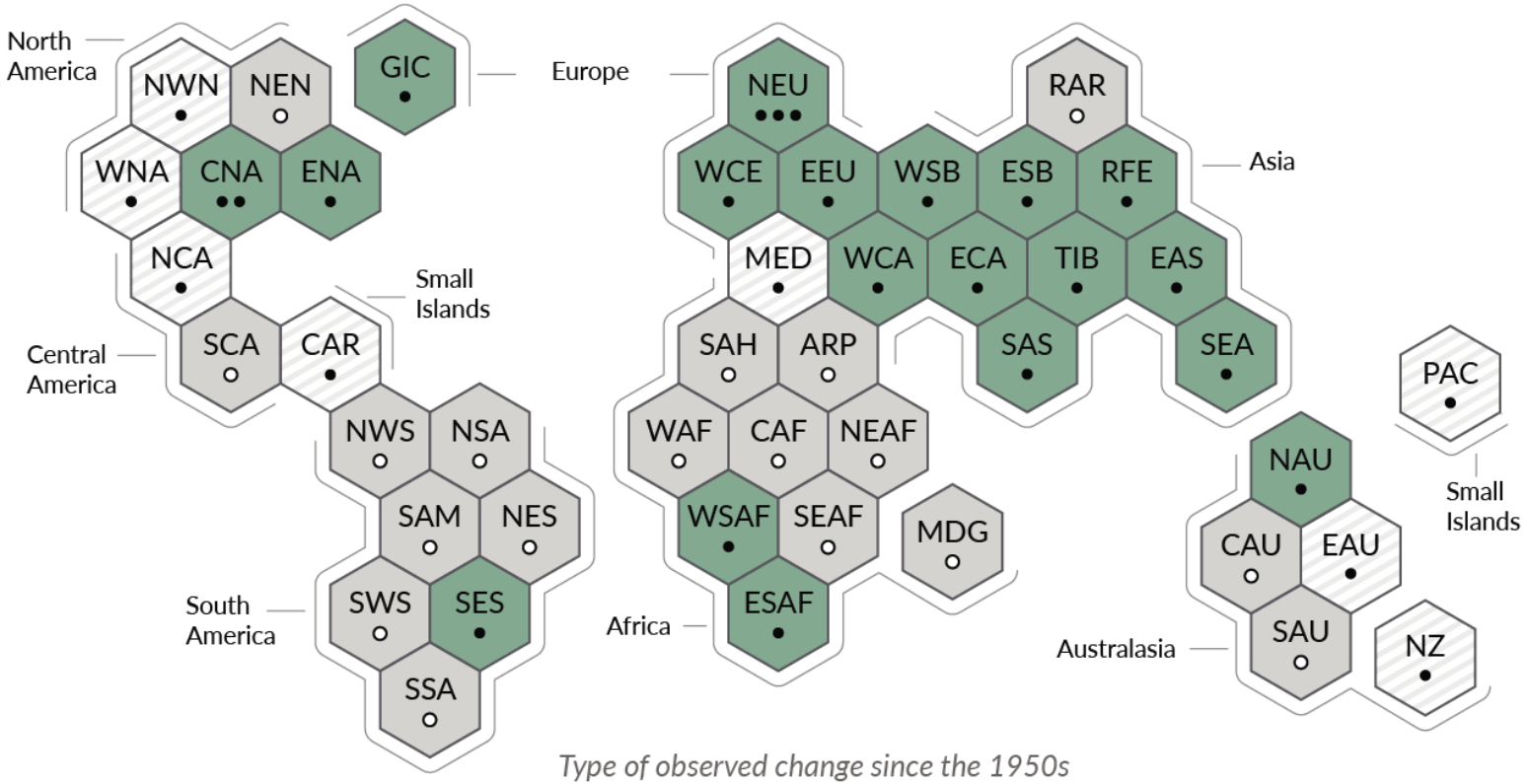
(b) Synthesis of assessment of observed change in **heavy precipitation** and confidence in human contribution to the observed changes in the world's regions

Type of observed change
in heavy precipitation

- Increase (19)
- Decrease (0)
- Low agreement in the type of change (8)
- Limited data and/or literature (18)

Confidence in human contribution
to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



Type of observed change since the 1950s

Attributable changes

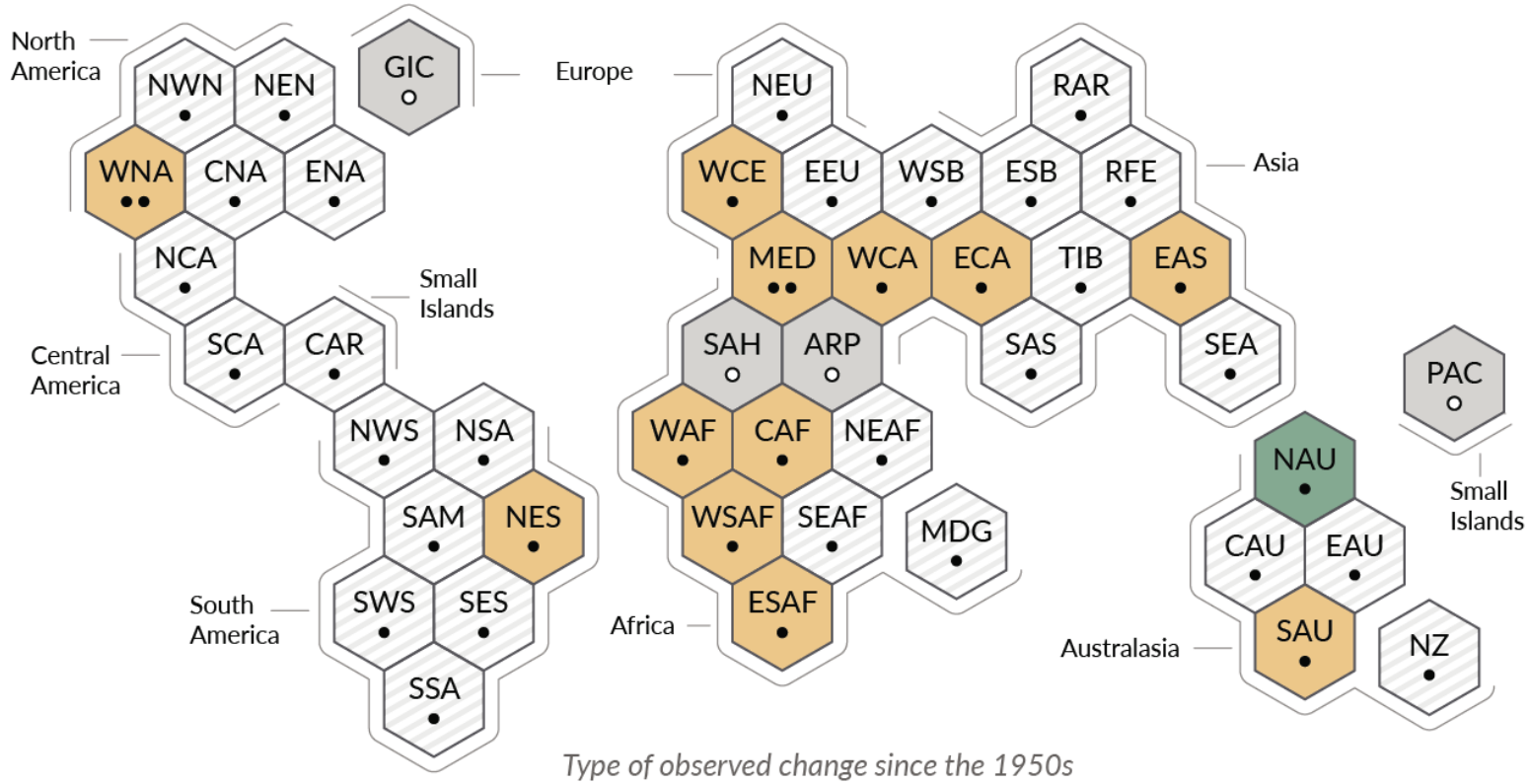
(c) Synthesis of assessment of observed change in **agricultural and ecological drought** and confidence in human contribution to the observed changes in the world's regions

Type of observed change
in agricultural and ecological drought

- Increase (12)
- Decrease (1)
- Low agreement in the type of change (28)
- Limited data and/or literature (4)

Confidence in human contribution
to the observed change

- ●●● High
- ●● Medium
- ● Low due to limited agreement
- ○ Low due to limited evidence



Type of observed change since the 1950s

Attributable changes

Extreme Sahel heatwave that hit highly vulnerable population at the end of Ramadan **would not have occurred without climate change**

"…a surge in hospital admissions and deaths were reported from the Gabriel Touré hospital in Bamako, Mali between 1-4 April (Bahati, 2024).

The hospital recorded **102 deaths over the four-day period**, which is significantly more than expected – in April 2023, the hospital recorded 130 deaths over the entire month…"

Ouagadougou, Burkina Faso. Image by Guillaume Colin & Pauline Penot.

Attributable changes

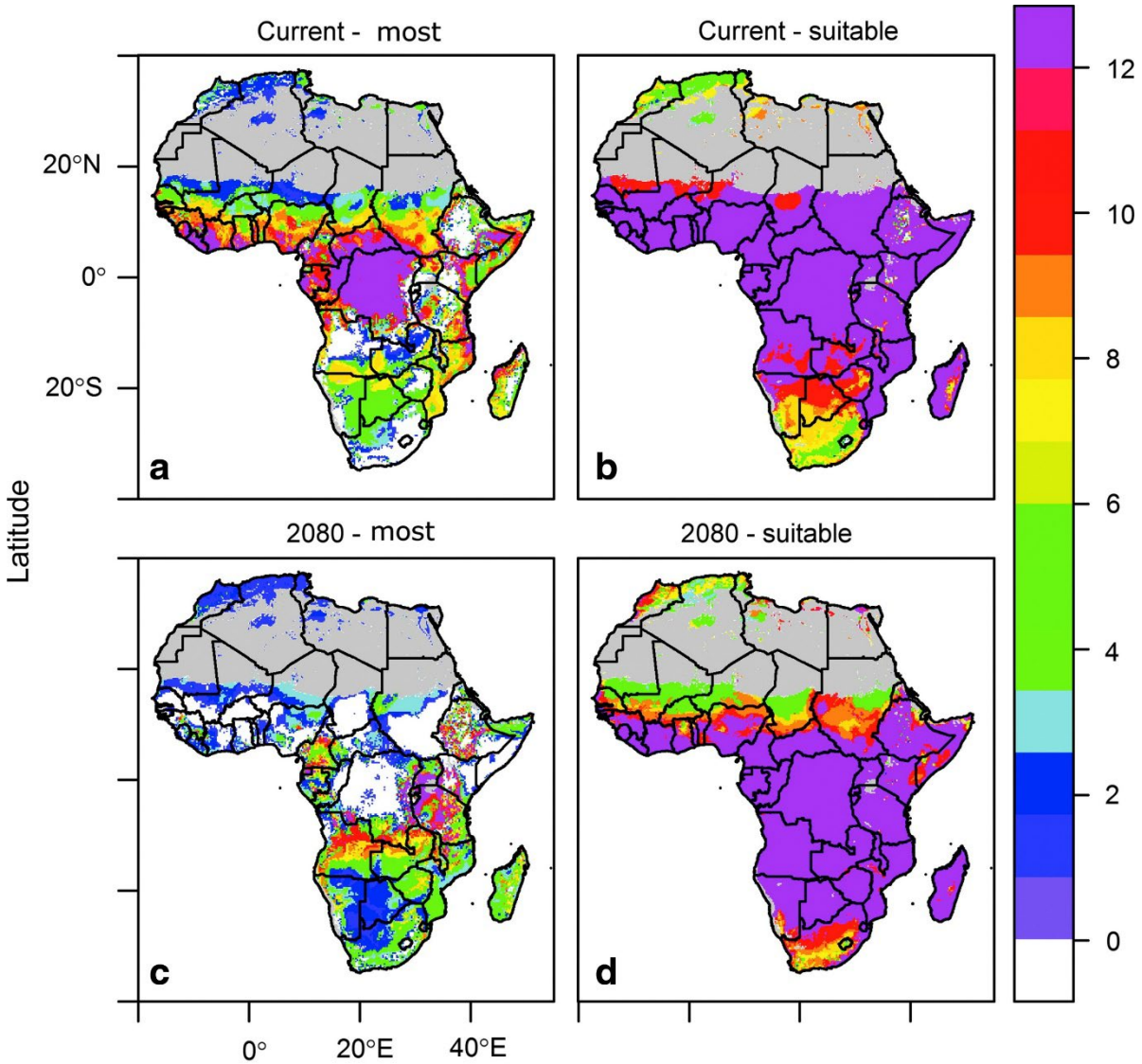
Red Cross volunteers assist people affected by floods in Kournari, Chad. Image by Red Cross Chad.

Unprecedented rainfall in large parts of the Sahel region, leading to **catastrophic flooding in Sudan in August and in Nigeria, Niger, Chad and Cameroon** in September. In total **more than 2000 people lost their lives** and millions were displaced.

Probability of this event occurring could be double because of historical climate change

Conflict, poverty and water management issues exposing vulnerable communities in Africa to extreme **floods that are now common events because of climate change**

Attributable changes



Climate hazards are increasingly contributing to a growing number of adverse health outcomes (including communicable and non-communicable diseases (NCDs)) in multiple geographical areas (very high confidence).

The net impacts are largely negative at all scales (very high confidence),

and there are very few examples of beneficial outcomes from climate change at any scale (high confidence).

e.g. global malaria prevalence is decreasing but clear shifts in suitable climates towards higher latitudes

IPCC AR6 WGII Chapter 7

Ryan, S. J., McNally, A., Johnson, L. R., Mordecai, E. A., Ben-Horin, T., Paaijmans, K., & Lafferty, K. D. (2015). Mapping physiological suitability limits for malaria in Africa under climate change. Vector-Borne and Zoonotic Diseases, 15(12), 718-725.

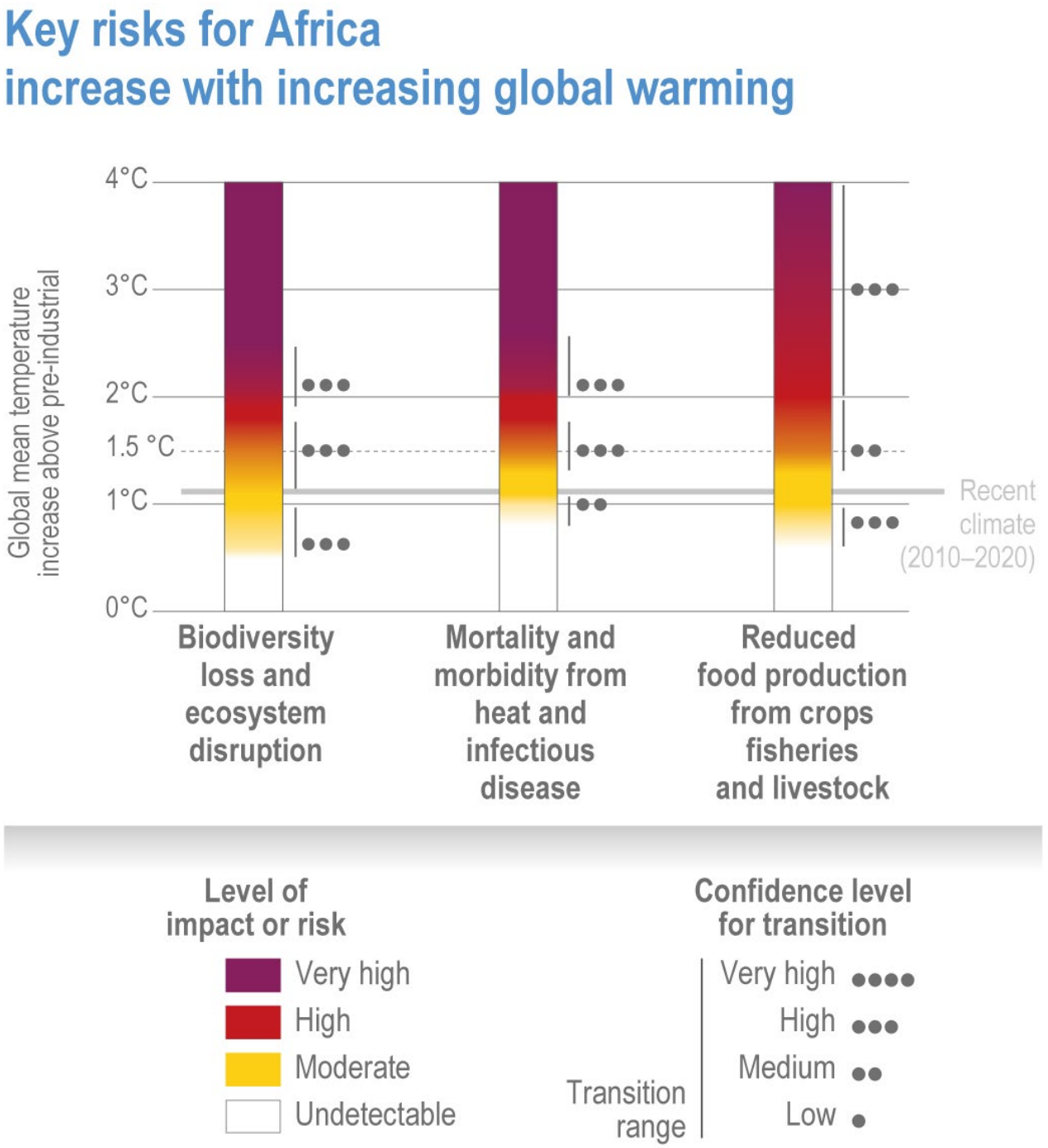
Future risk

Assuming we reach 2C warming we have high confidence of very high risks and impacts across Africa for ecosystems, human health, and food systems

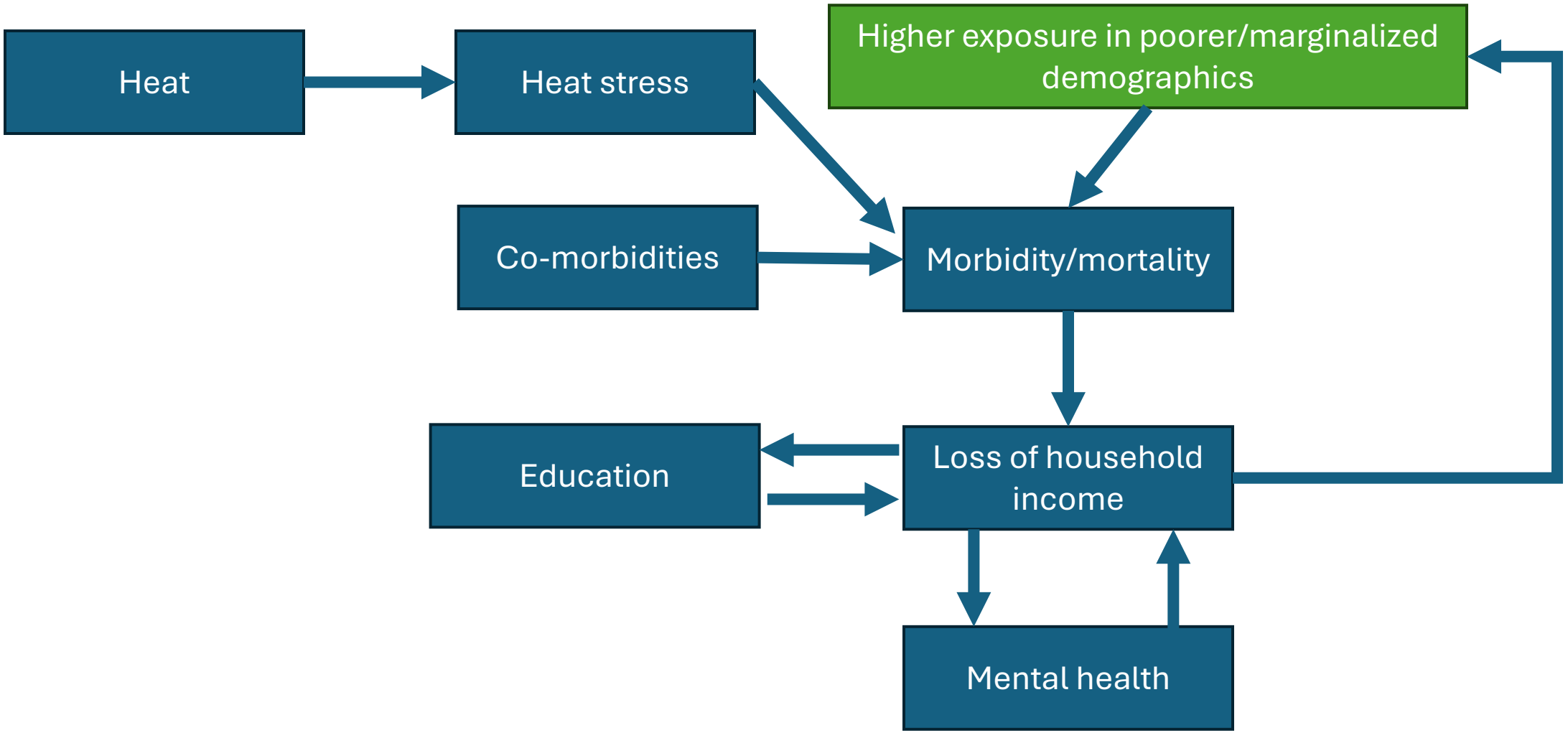
Coastal inundation and groundwater salination

Urban water – quantity and quality

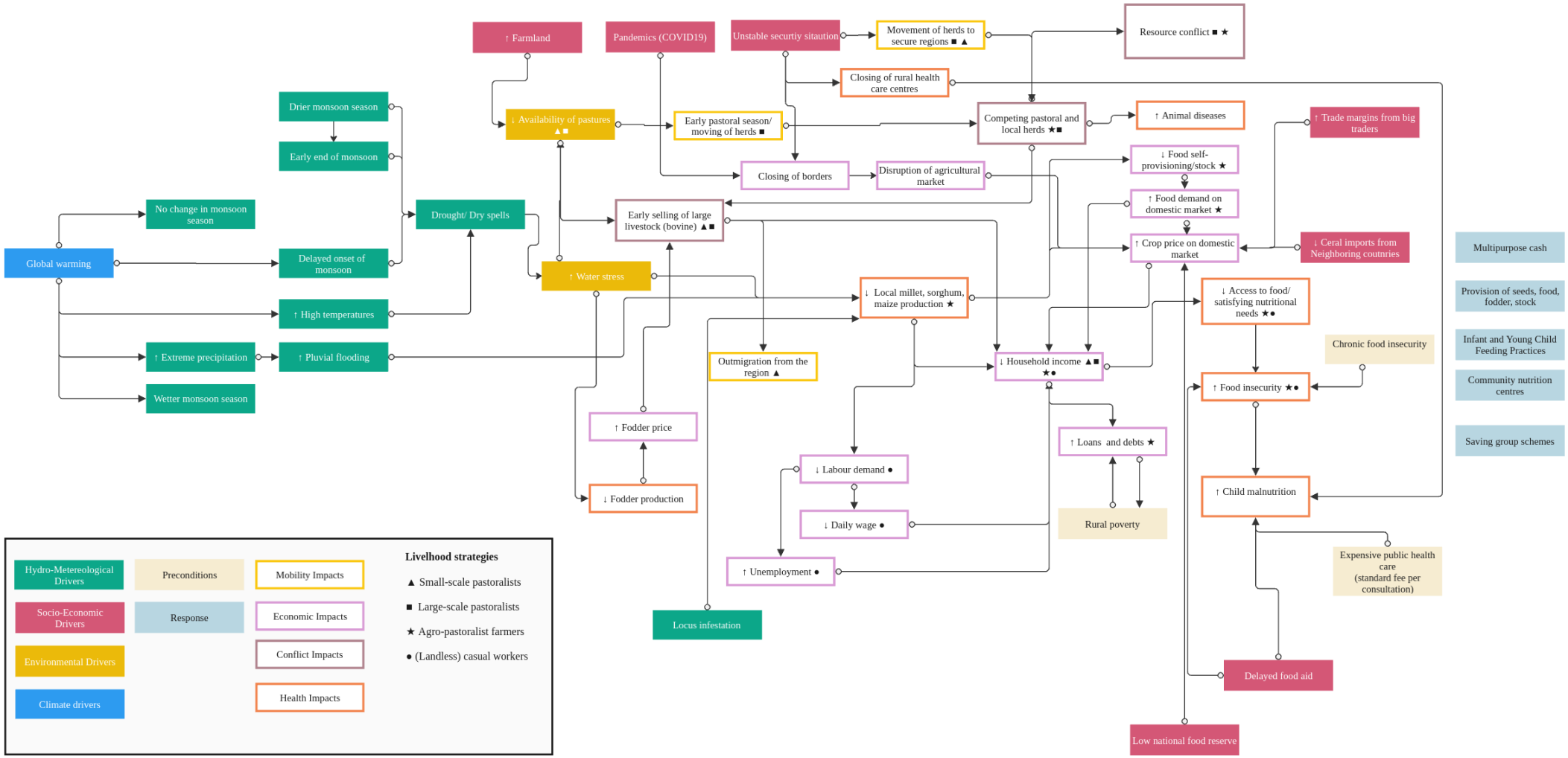
Compounding and cascading hazards



(Vicious) cycles of risk and impact



(Vicious) cycles of risk and impact



The danger of a single story

Stories matter.

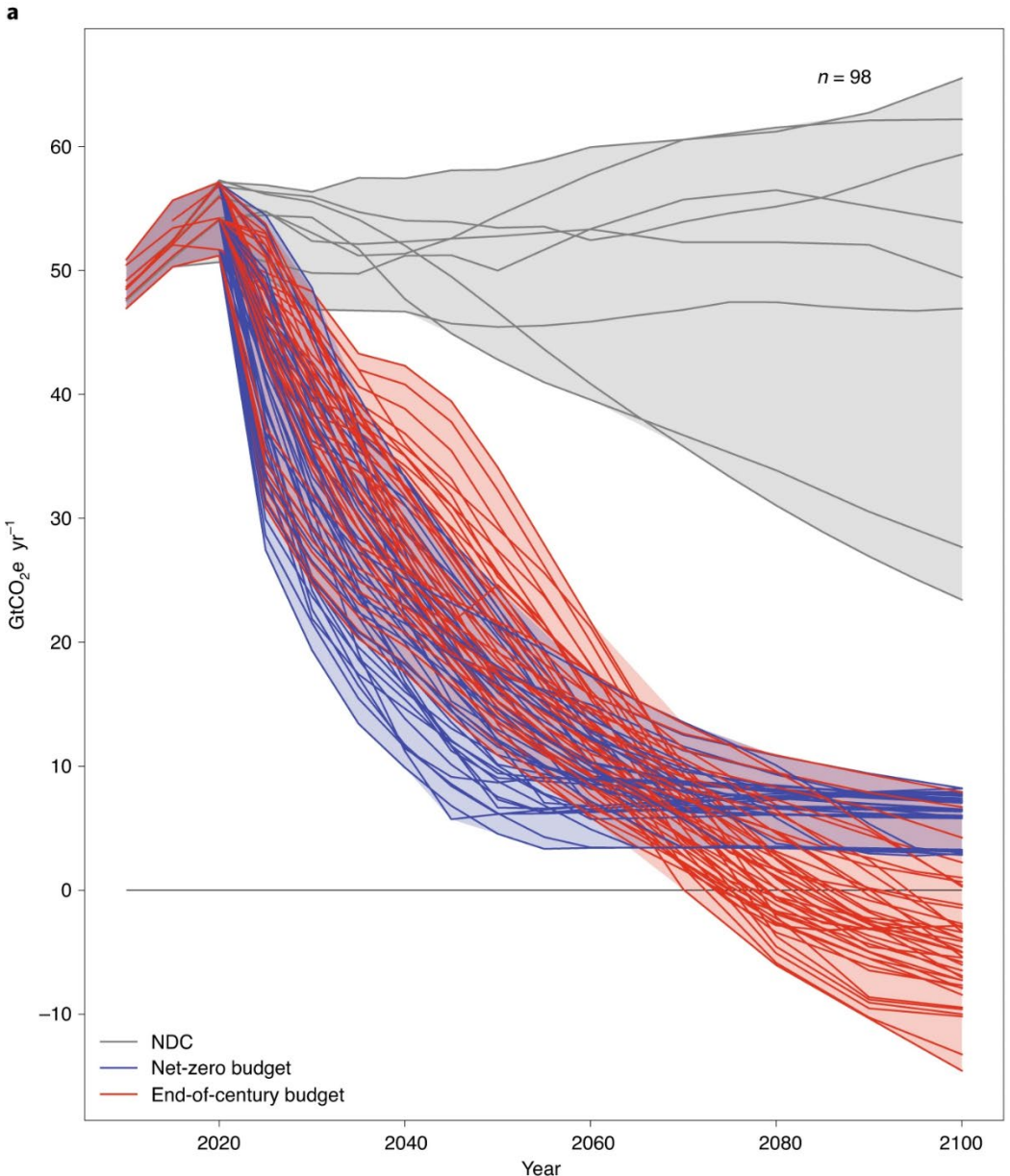
Many stories matter.

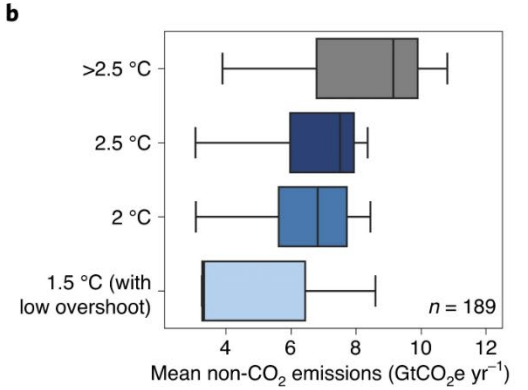
Stories have been used to dispossess and to malign, but stories can also be used to empower and to humanize.

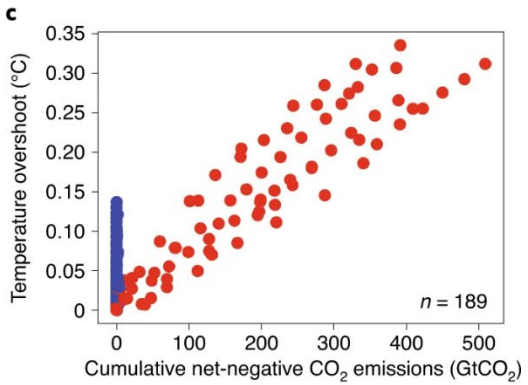
Stories can break the dignity of a people, but stories can also repair that broken dignity.

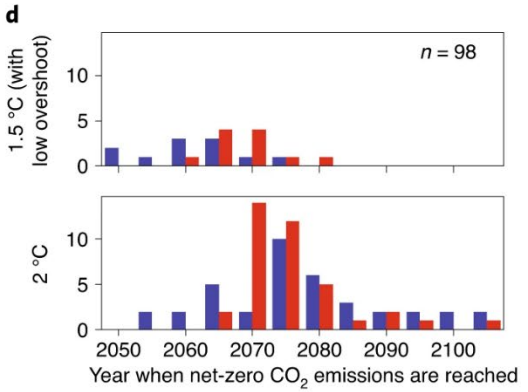
Chimamanda Adichie

Can we reduce emissions fast enough?









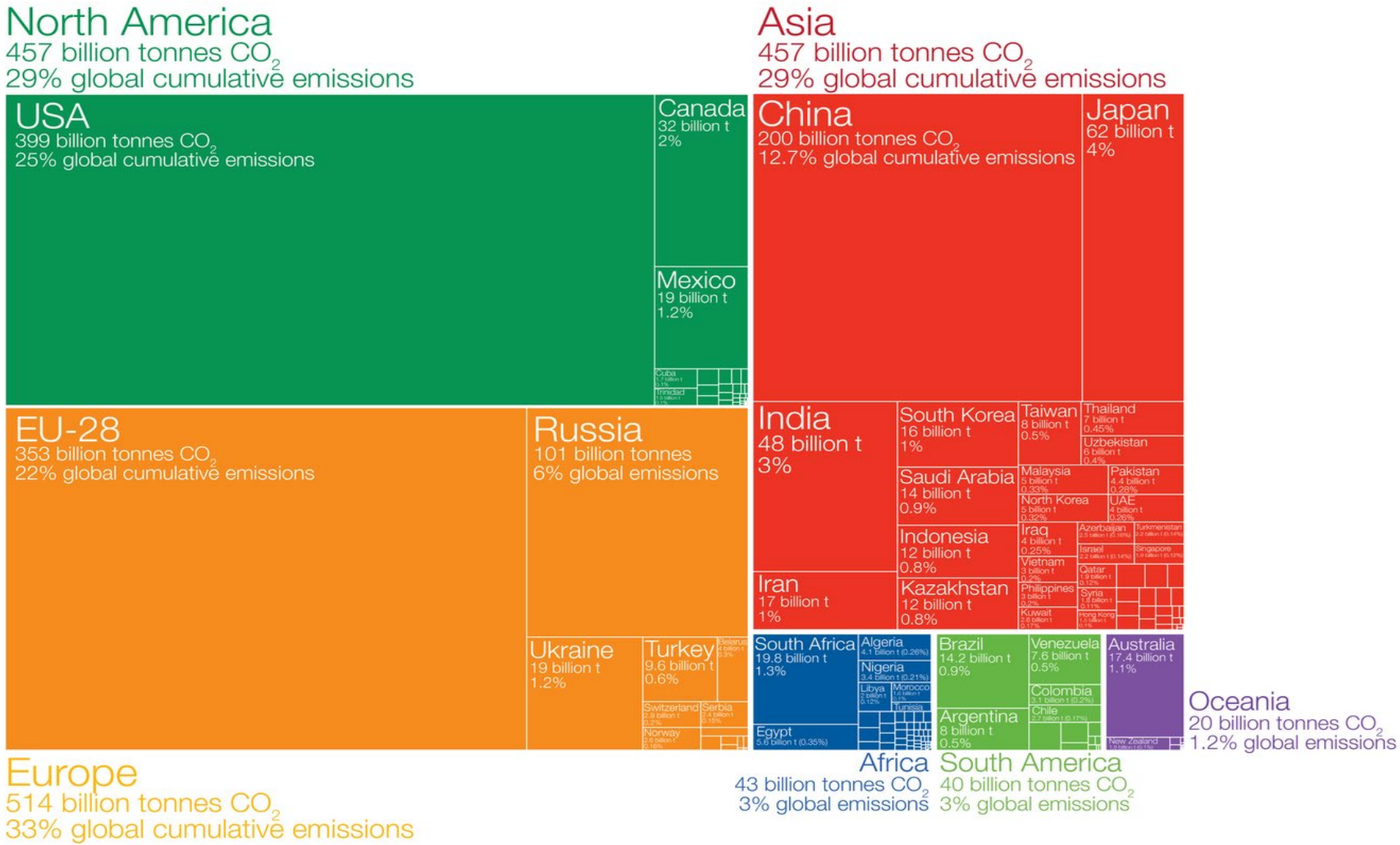
Current emissions reductions commitments are not enough to avoid 2°C warming without overshoot

Almost all emissions pathways that avoid 2°C warming require negative emissions technology

Who has contributed most to global CO_2 emissions?

Our World in Data

Cumulative carbon dioxide (CO_2) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO_2 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.



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, where you find data and research on how the world is changing.

Why is adaptation not happening?

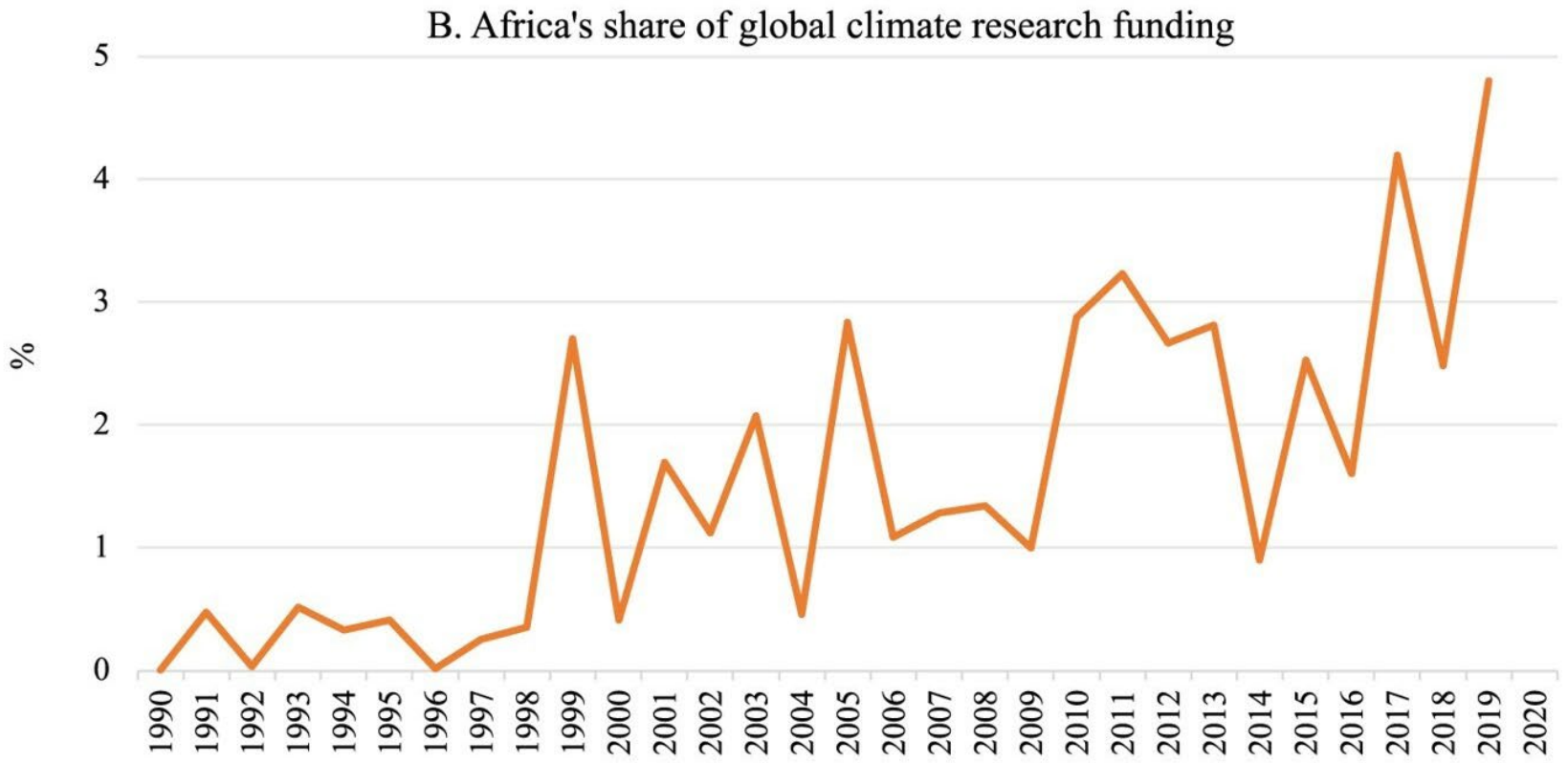
Lack of political will
Why are we failing to generate political will?

Lack of evidence
Are we generating the evidence we need?

Are we telling the stories that need to be told?

Too much uncertainty
In many cases the existing adaptation deficit is clear enough evidence

Research funding



At most 3.8% of global funding for climate-change research is spent on African topics

African institutions received only 14.5% of this 3.8%

Overland, I., Fossum Sagbakken, H., Isataeva, A., Kolodzinskaia, G., Simpson, N. P., Trisos, C., & Vakulchuk, R. (2022). Funding flows for climate change research on Africa: where do they come from and where do they go?. Climate and Development, 14(8), 705-724.

“Bottom up” transdisciplinary action research

Start by understanding the context
How does climate intersect with the multitude of other challenges?

How are decisions made, who holds power, who needs power?

Building trust and empathy

Co-developing effective interventions

Humble science

A new generation of researchers, decision makers, and activists