

Climate Change 2022

East Africa and climate change in the latest IPCC report

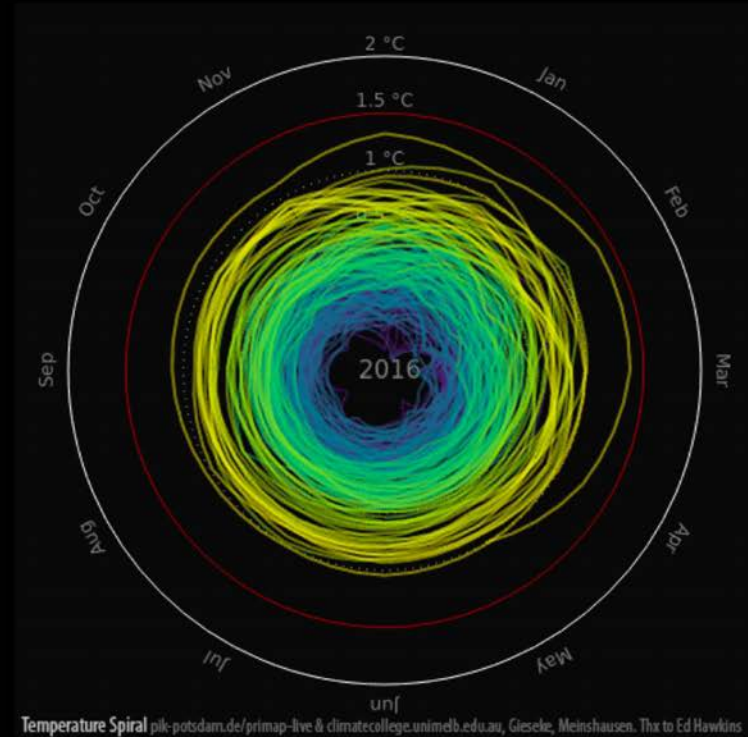
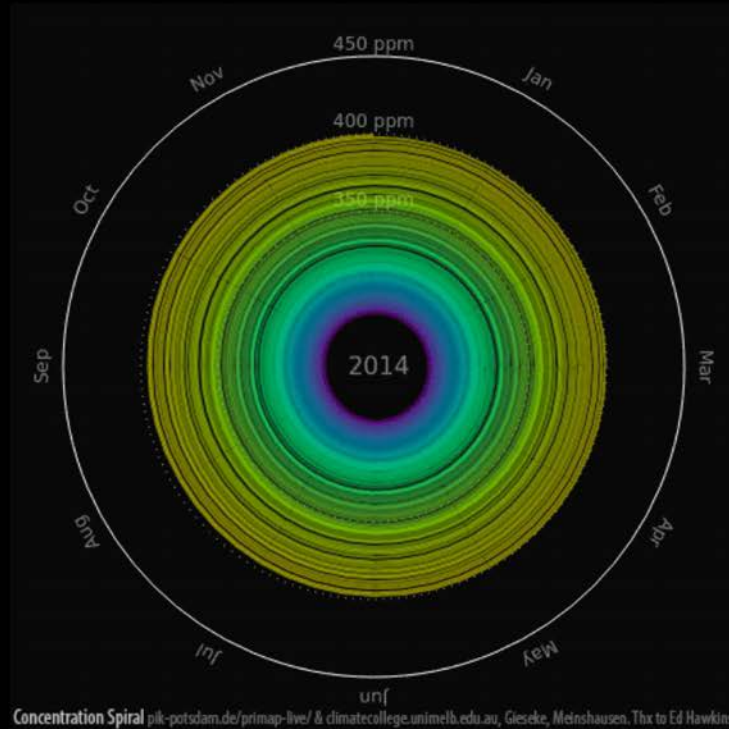
Jean-Pascal van Ypersele (UCLouvain, Belgium, Candidate IPCC Chair)

University of Addis Abeba, 11 April 2023

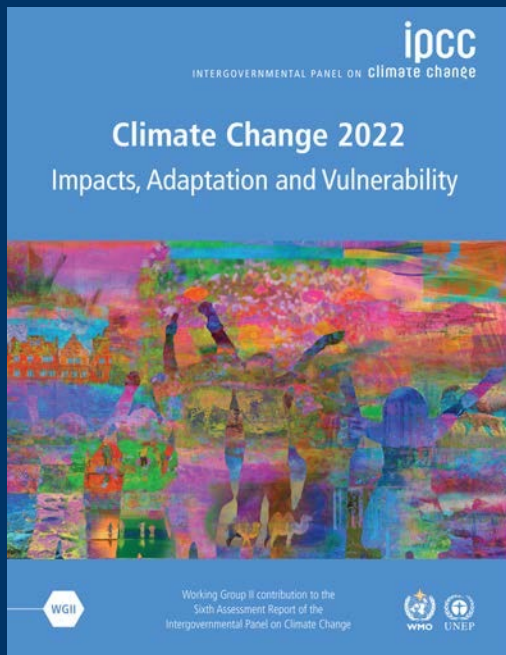
Some slides are from a presentation by the co-Chairs of IPCC Working Group II



CO₂ Concentration and Temperature spirals



CO₂ Concentration since 1850 and Global Mean Temperature in °C relative to 1850 – 1900
Graph: Ed Hawkins (Climate Lab Book) – Data: HadCRUT4 global temperature dataset
Animation available on <http://openclimatedata.net/climate-spirals/concentration-temperature/>



“ The scientific evidence is unequivocal: climate change is a threat to human well-being and the health of the planet.

Any further delay in concerted global action will miss the brief, rapidly closing window to secure a liveable future.

This report offers solutions to the world.

Global warming
has caused dangerous and
widespread disruption in nature...

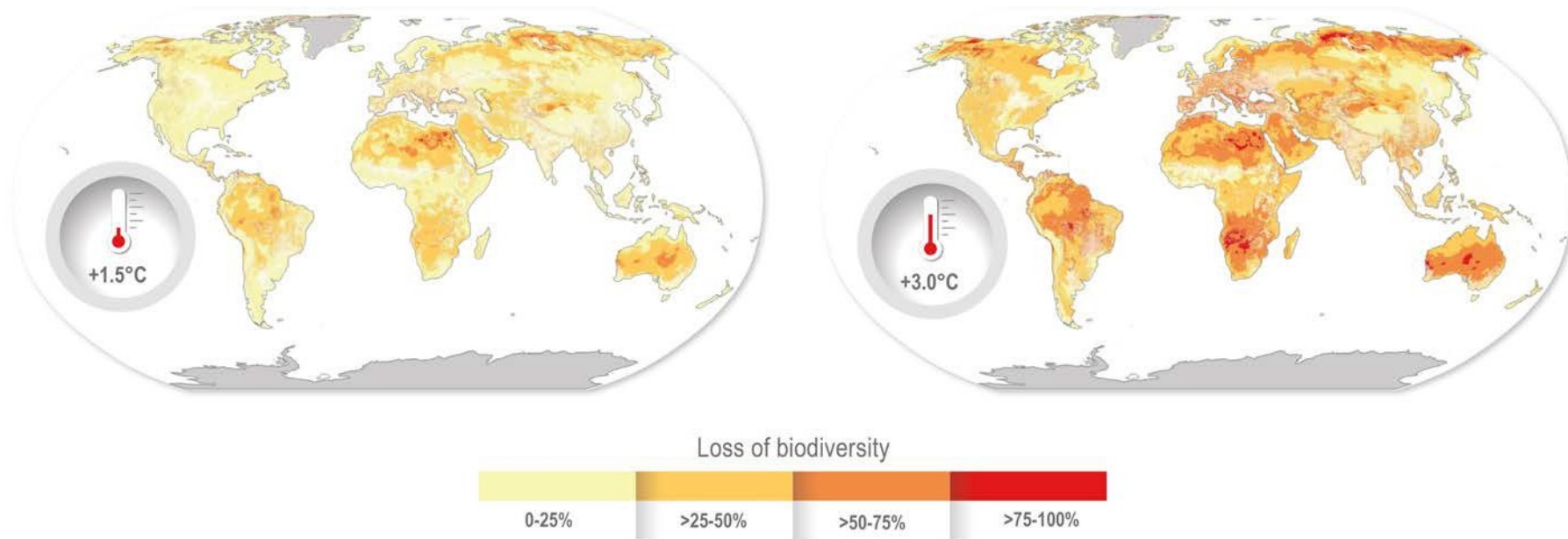
...and climate change is affecting the lives of billions of people, despite efforts to adapt.



3.3 – 3.6 billion people live in hotspots of high vulnerability to climate change.



Biodiversity loss at different warming levels



Future global climate risks



Heat stress

Exposure to heat waves will continue to increase with additional warming.



Water scarcity

At 2°C, regions relying on snowmelt could experience 20% decline in water availability for agriculture after 2050.



Food security

Climate change will increasingly undermine food security.

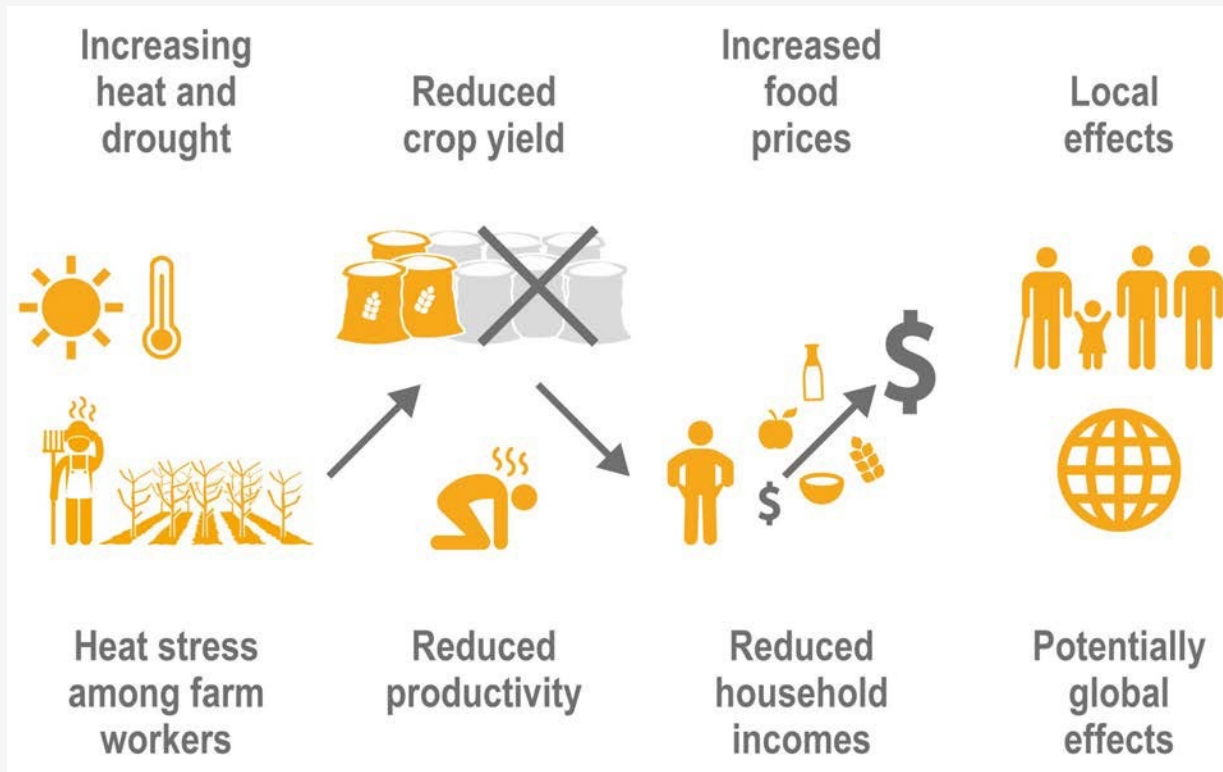


Flood risk

About a billion people in low-lying cities by the sea and on Small Islands at risk from sea level rise by mid-century.

Simultaneous extreme events compound risks

Multiple extreme events that compound the risks are more difficult to manage



Major impacts in Africa

- Global hotspots of high human vulnerability: particularly in **W-, C- and E- Africa**, South Asia, Central and South America, Small Island Developing States and the Arctic (WG2 SPM B.2.4)
- Increasing extreme events => millions of people exposed to acute food insecurity and reduced water security. Largest impacts observed: **Africa**, Asia, Central and South America, Small Islands and the Arctic (WG2 SPM B.1.3)
- Largest absolute number of people displaced by extreme weather each year: 1) Asia, 2) **sub-Saharan Africa**. (WG2 TS B.6.1)

Major impacts in Africa

- Agricultural productivity growth in Africa: - 34% since 1961 due to climate change (> than any other region) (WG2, Chap. 9, Exec Summary)
- GDP per capita for 1991–2010 in **Africa** lower than if climate change had not occurred (one estimate: 13,6%) (WG2, Chap 9, Exec. Summary)
- Impacts on food security, nutrition and livelihoods are particularly acute for people living in **sub-Saharan Africa**, Asia, small islands, C- and S- America and the Arctic (WG2, TS, B.3.3.)

Major impacts in Africa

- Between 1970 and 2019, 7% of all disaster events worldwide were drought related, yet they contributed to 34% of disaster-related deaths, **mostly in Africa** (WG2, TS, B.5.1)
- 1986–2005: total exposure to dangerous heat **in Africa's** 173 largest cities = 4.2 billion person-days/yr (WG2, 7.2.4.1)

Major threats in Africa

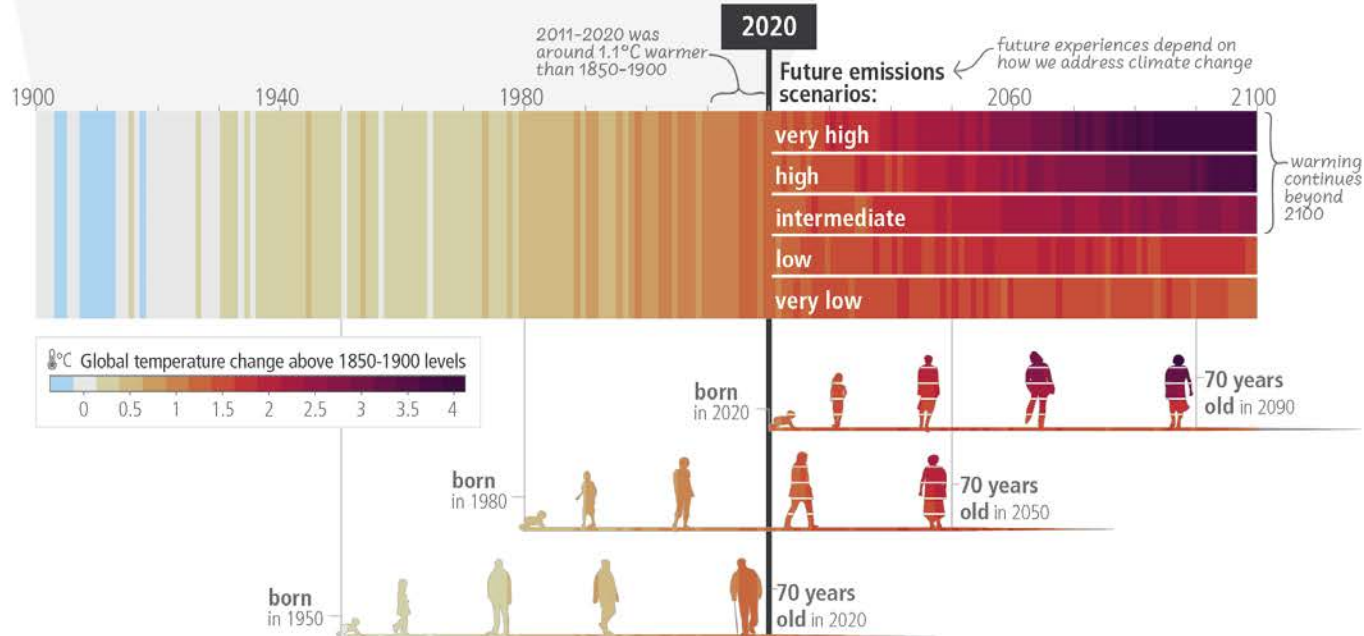
- Increasing exposure to river flooding => expected human displacement increasing 200% for 1.6°C and 600% for 2.6°C (in **many African regions**) (WG2, TS, C.4.5) ■ By 2030, 108–116 million people **in Africa** will be exposed to sea level rise (WG2, Chap. 9, Exec. sum.)
- At 2°C or higher food security risks will be more severe => malnutrition and micro-nutrient deficiencies, concentrated in **Sub-Saharan Africa**, South Asia, C- and S America and Small Islands (WG2, SPM, B.4.3)
- Under mid-range emissions scenarios: + 250,000 deaths/yr by 2050 globally (compared to 1961–1990) due to malaria, heat, childhood undernutrition and diarrhoea. **> 50% projected for Africa** (WG2, TS, C.5.4)

Major threats in Africa

- At 1.5°C GW, marine fish catch potential decreases 3–41% (12–69% at 4.3°C) by 2081–2100 relative to 1986–2005 levels (highest declines for tropical countries). (WG2, Chap. 9, Exec.sum)
- 8 million (SSP1-6.0) to 80 million people (SSP3-6.0) at risk of hunger in mid-century, concentrated in **sub-Saharan Africa**, South Asia and Central America (WG2, TS, C.6.4)
- Livestock: net primary productivity (NPP) by 2050: - 5% in both E- Africa and C- Africa (RCP8.5 - 2.4°C GW) (WG2, 9.8.2.4)
- Urban pop. exposure to extreme heat **in Africa** from 2 billion person-days/yr (1985–2005) to 45 bn person-days by the 2060s (1.7°C GW + low population growth) and to 95 bn (2.8°C GW + medium-high population growth) (WG2, TS, C.9.2)

Adverse impacts from human-caused CC will continue to intensify

c) The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term



A focus on East Africa

- Severe impacts from tropical cyclone landfalls have been recorded in east and southeastern Africa (WG2, 9.9.2.1)
- Extensive drought across Tanzania, Ethiopia, Kenya and Somalia contributed to extreme food insecurity approaching near-famine conditions. Likelihood doubled due to GW. (WG2, Chap. 4, Table 4.4)
- Displacements due to droughts, extreme heat and associated impacts on food and water security: most frequent in east Africa (WG2, 7.6.6.1)
- Future warming will shorten growing seasons and increase water stress. By 1.5°C, suitable areas for coffee and tea will decrease in East Africa (WG2, Chap. 9, Box 9.1)
- The risks of no available genetic varieties of maize for growing season adaptation are higher for east Africa and southern Africa (WG2, 9.8.1)
- In some regions (e.g., Kenya), links between observed water stress and individual attitude for participating in violence (WG2, 4.3.6)
- Warming will increase the risk of malaria in highland East Africa and Southern Africa (while decreasing risk in some lowland areas) (WG2, Cross-Chapter Box 9.2.5.5.5)
- Coral reef habitat projected to decrease=> negative impacts on demersal fish stocks and invertebrates (WG2, 9.8.1.2)
- 2005–2020: flood-induced damage over Africa estimated at > USD 4.4 bn, E- & W-Africa the most affected (WG2, 9.9.2.1)
- SLR and associated episodic flooding: key drivers of proj. net migration of 750,000 people out of the east African coastal zone between 2020 and 2050 (WG2, 9.9.4.1.2)

IPCC AR6 WGII Box 5.8: Climate Adaptation and Maladaptation in Cocoa and Coffee Production

Coffee and cocoa are important crops in low latitude regions where agriculture is projected to be heavily impacted by climate change. Both crops are at risk from climate change impacts by 2050.

Chocolate and coffee are notable among foods in that their carbon footprint ranges from negative to high, as these industries include both low-input agroforestry systems that have many co-benefits, and high-input monoculture systems where crops are grown without shade, in some cases on sites that have been deforested.

IPCC AR6 WGII Box 5.8: Climate Adaptation and Maladaptation in Cocoa and Coffee Production

The choice of cropping-system will have wide-reaching consequences for climate vulnerability and climate justice. Coffee and cocoa are often a main source of income for small-scale producers who are among the most vulnerable to climate hazards.

Most of their produce is exported by large corporations and sold to relatively better-off consumers. In the context of climate justice, underlying structural inequalities (socioeconomic, ethnicity, gender, caste), marginality, and poverty help to shape the vulnerabilities of small-scale farmers to climate hazards.

(...) Adaptation needs to consider the inequalities associated with the commodity chain, and the adaptative capacity of producers as they seek to move into the more advanced processing stages of the commodity chain to realize higher returns from their exports.



There are limits to adaptation

- Even effective adaptation cannot prevent all losses and damages
- Above 1.5°C some natural solutions may no longer work.
- Above 1.5°C, lack of fresh water could mean that people living on small islands and those dependent on glaciers and snowmelt can no longer adapt.
- By 2°C it will be challenging to farm multiple staple crops in many current growing areas.

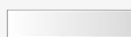
Increasing urgency

Starting today,
every action, every
decision matters.

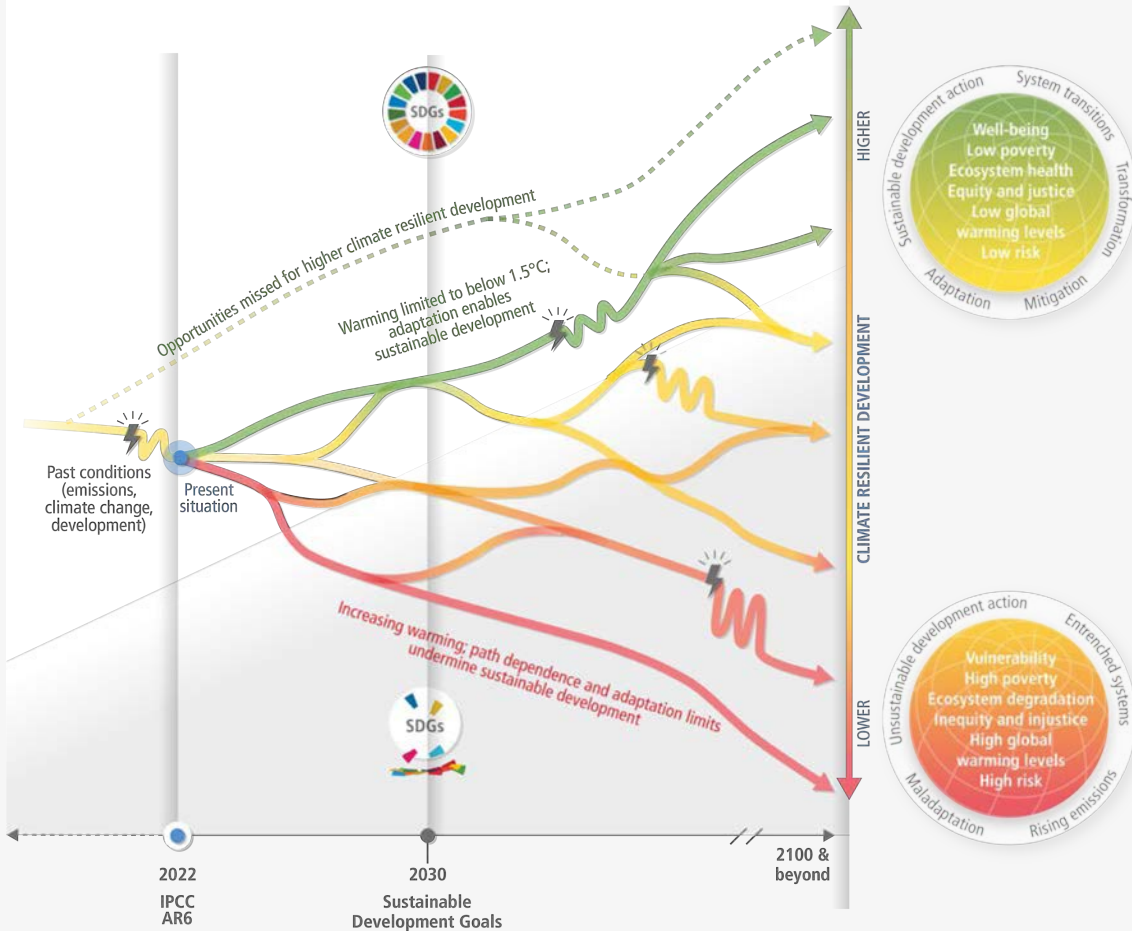
Worldwide action is more urgent
than previously assessed.



Illustrative climatic or non-climatic shock,
e.g. COVID-19, drought or floods,
that disrupts the development pathway



Narrowing window of
opportunity for higher CRD



Mitigation, adaptation and finance

- GHG mitigation is projected to save tens of thousands of lives: limiting warming to RCP4.5 (2.5°C) rather than RCP8.5 (4.4°C) at the end of the century is projected to avoid on average 71 deaths per 100,000 people annually across Africa with larger reductions in risk in north, west, central and parts of east Africa (WG2, 9.10.2.3.1)
- **Ecosystem-based adaptation can reduce climate risk while providing social, economic and environmental benefits.** Direct human dependence on ecosystem services in Africa is high. Ecosystem protection and restoration, conservation agriculture practices, sustainable land management, and integrated catchment management can support climate resilience. (WG2, Chap. 9, Exec. sum.)

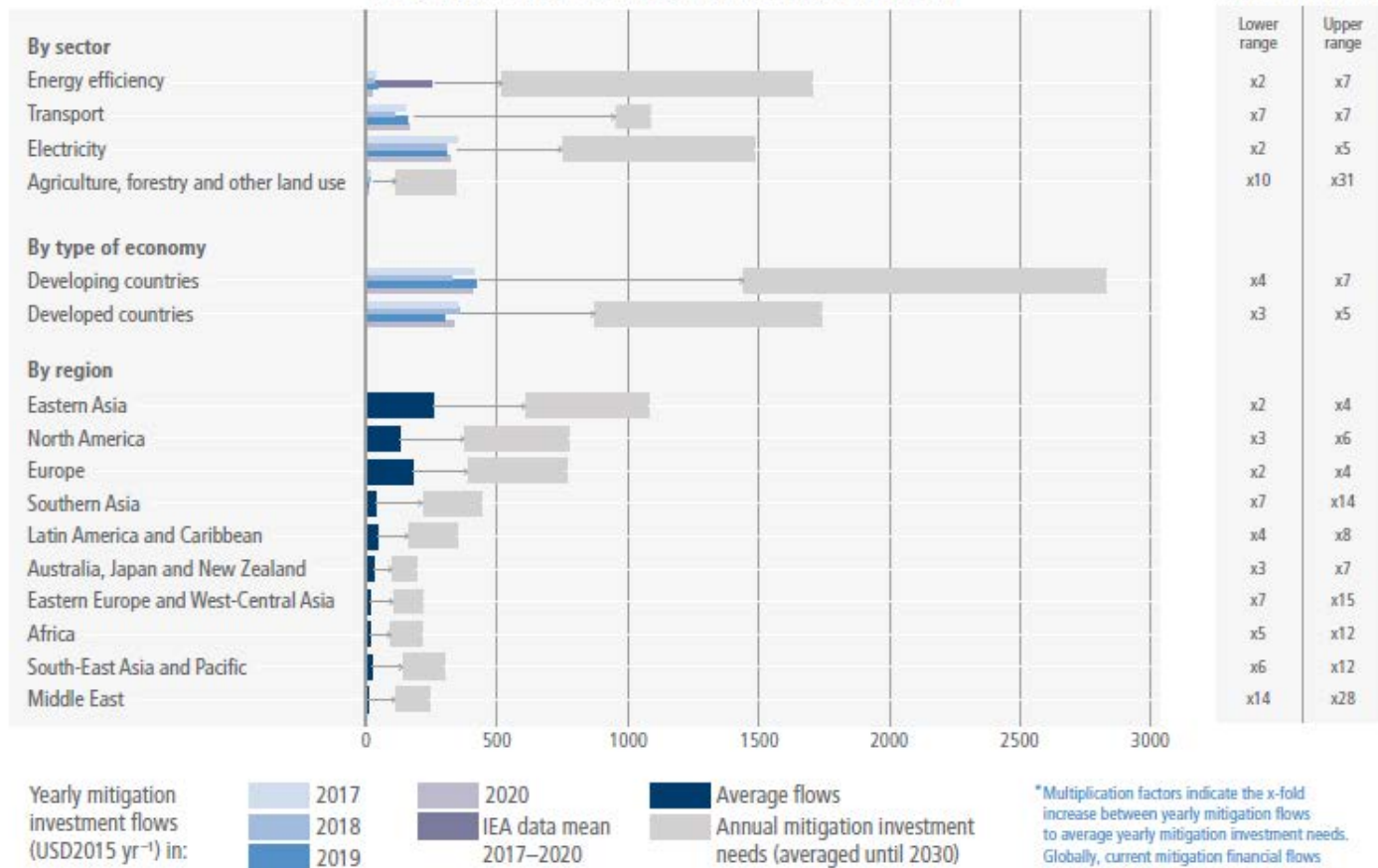
Mitigation, adaptation and finance

- **Africa** faces an estimated 40% infrastructure financing gap. This gap is almost certainly higher in the continent's rapidly growing cities (WG2, Box 6.8), which are hotspots of risks (WG2, Chap.9, Exec sum)
- « Accelerated financial support for developing countries from developed countries and other sources is a critical enabler to enhance mitigation action and address inequities in access to finance, including its costs, terms and conditions, and economic vulnerability to climate change for developing countries (*high confidence*). Scaled-up public grants for mitigation and adaptation funding for vulnerable regions, **especially in Sub-Saharan Africa**, would be cost-effective and have high social returns in terms of access to basic energy » (WG2, SPM, E.5.3)

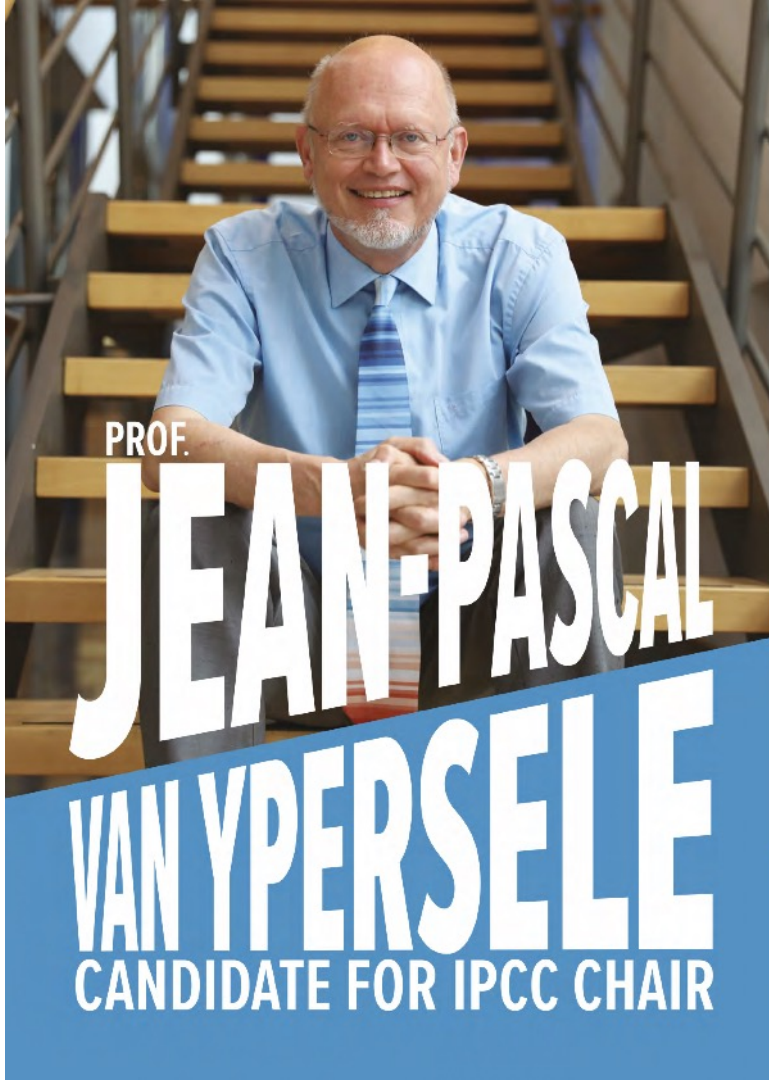
Climate finance gap

Actual yearly flows compared to average annual needs (billion USD 2015 yr⁻¹)

Multiplication factors*



*Multiplication factors indicate the x-fold increase between yearly mitigation flows to average yearly mitigation investment needs. Globally, current mitigation financial flows are a factor of three to six below the average levels up to 2030.



PROF.

JEAN-PASCAL VAN YPERSELE

CANDIDATE FOR IPCC CHAIR

STANDING FOR

- IPCC as the global VOICE of climate
- Connecting solid science and the world's policy makers
- Delivering a more inclusive, dynamic, and relevant IPCC

UN SDGs
CLIMATE JUSTICE
A FAIR TRANSITION

With the official
support of the
Belgian Government

EXPERIENCE & ENERGY

- IPCC Vice-Chair (2008–2015) and active in IPCC since 1995
- 40 years experience in climate science and diplomacy
- Full professor of climate and sustainable development (UCLouvain)
- Global Sustainable Development Report 2019 co-author
- Lead Author for the Third Assessment Report
- High profile media commentator and spokesperson
- Strong track record of advocacy, chairing, and partnerships
- An award-winning science communicator

READY TO REPRESENT

- Global North AND South
- Interdisciplinary science AND policy making
- People, science, AND decisive action

Highly experienced global player from the first Rio Summit in '92 through to the latest COP via a wide range of working groups, task forces, and scientific conferences.

More information www.climate.be/vanyp @JPvanYpersele

#IPCCvoiceOfClimate

Image on reverse © Kara Worth

Key aspects of my IPCC Chair candidacy

1. The IPCC must be the most scientifically solid
« **Voice of Climate** » at the international level
2. The IPCC must become even **more useful** for
policy- and decision-makers, while staying
policy-neutral

Key aspects of my IPCC Chair candidacy

3. The IPCC must be **inclusive** (gender balance, developing countries participation...), **respectful** of all people and cultures, open to more disciplines and more **interdisciplinarity**, and help train more **young scientists** into the IPCC process
4. IPCC procedures & products need to be updated to **respond better to the new needs** of UNFCCC and others

Conclusions

The challenge is huge: transform the world in a few decades so that the whole world activities are decarbonized and climate resilient

Addressing it open so many opportunities, for research and innovation accross disciplines sectors, and for integrating results of this research in meaningful actions by all: governments, cities, businesses, NGOs, and citizens.

It opens also economic opportunities, and opportunities to address in a synergistic manner other societal goals, such as the 17 UN Sustainable Development Goals (including eliminating poverty and hunger in a few decades).

To go further :



- www.climate.be/vanyp: my slides, under « conferences »
- www.ipcc.ch: IPCC
- www.skepticalscience.com: answers to the merchants of doubt arguments
- www.plateforme-wallonne-giec.be: IPCC-related in French, Newsletter, latest on climate, basic climate science
- **Twitter: @JPvanYpersele & @IPCC_CH**