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# Coping with Climate Change in Africa

**Africa is particularly exposed to the impacts of global warming.**

**+ 1.4 °C** the increase in average temperature in Africa since the pre-industrial period

vs.

**+ 1.1 °C** on a worldwide scale

**Africa is therefore warming faster than the global average.**

## This increase may still seem small. But it's already generating real consequences:

Rise in **extreme temperatures**, longer and more frequent **heat waves across the continent**.

**Decreased rainfall** in Morocco, the coastal regions of Algeria and Tunisia, the Western Sahel, and Cameroon

**Increased tree loss** in the Congo Basin due to drought

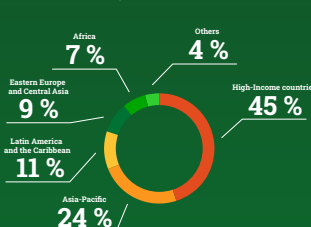
**Half** of IPCC-assessed species are projected to **lose over 30 percent of their population**

**High coral mortality** in the western Indian Ocean

Slowdown in **economic growth**

## Yet, Africa bears little responsibility for climate change

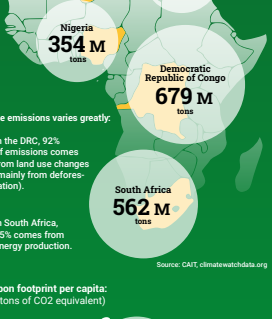
↗ Cumulative greenhouse gas (GHG) emissions since the mid-19th century:




**Even today, Africa contributes only marginally to global annual emissions, at around 9%.**

**On the other hand, there are significant differences among the main emitting African countries according to whether we consider:**

↗ **Annual GHG emissions by country:**
(expressed in metric tons of $CO_2$ equivalent)



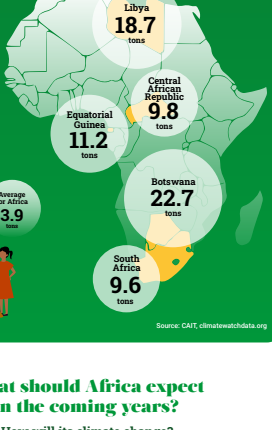

**The origin of these emissions varies greatly:**

In the DRC, 92% of emissions comes from land use changes (mainly from deforestation).

In South Africa, 85% comes from energy production.

Source: CAIT, climatewatchdata.org

↗ **Or annual carbon footprint per capita:**
(expressed in tons of CO2 equivalent)




Source: CAIT, climatewatchdata.org

## What should Africa expect in the coming years?

### How will its climate change? What impacts will the current changes have?

**"The 6th IPCC report considers that recent climate change in Africa has already led to a 'moderate' level of risk to biodiversity, human mortality and infectious diseases, as well as to agricultural production systems."**

*L'Economie africaine 2023*, Agence Française de Développement and La Découverte

How this level of risk evolves will depend on the future amounts of GHGs emitted by human activities and the way in which the climate system responds to climate change.

**However, here's what recent scientific studies predict:**

## Temperatures and heat waves

**Temperatures will continue to rise throughout Africa.**

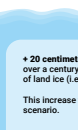
**In North Africa:**

Number of days of heat wave per year:

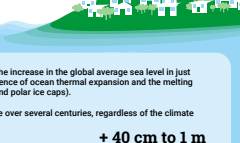

*According to a climate scenario estimate of a medium or large increase in GHG emissions

**+ 4°C** in summer / **+ 2.5°C** in winter

median temperature rise by the end of the century in a scenario of medium global GHG emissions

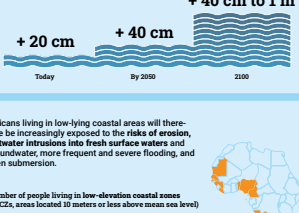


**With a 2.7°C temperature rise in Morocco, Algeria an Tunisia, average river flow could decrease by more than 30%**, i.e. around 2060 in the event of high global GHG emissions.



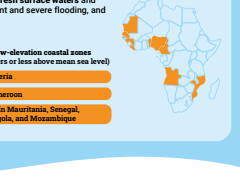

**In West Africa:**

Number of days per year with temperature above 40.6 °C:



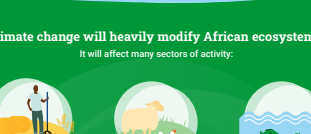

*Based on climate estimates, ranging from the most optimistic to the most pessimistic.

Abidjan, Accra, Lomé, Lagos: the tens of millions of people living in urban areas, especially in these large and growing megacities, will see their exposure to these extreme heat levels exacerbated by the phenomenon of "urban heat islands".




### But the worst is yet to come...

Number of days per year with potentially deadly heat conditions, i.e., when the air's temperature and humidity conditions are so severe that the body can no longer effectively regulate its temperature:




**These temperatures will have impacts on:**

Economic growth — Agricultural production — Health systems — Excess mortality

In other words, these regions would become inhospitable between 50 and 350 days a year.

## Rainfall

**Numerical models of climate change forecast the following for Africa:**

**A decrease in rainfall** in the southwestern parts of the continent and in the coastal regions of North Africa

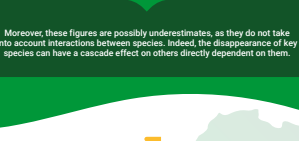
An **increase in average annual rainfall** over the eastern part of the Sahel region, eastern Africa, and Central Africa

On the Mediterranean coast, **drought periods could double from about 2 months to 4 months per year in the second half of the 21st century**, in the event of continued high global GHG emissions

## Rise in sea level

**+ 20 centimeters**: this is the increase in the global average sea level in just over a century, a consequence of ocean thermal expansion and the melting of land ice (i.e., glaciers and polar ice caps).

This increase will continue over several centuries, regardless of the climate scenario.




Africans living in low-lying coastal areas will therefore be increasingly exposed to the **risks of erosion, saltwater intrusions into fresh surface waters** and groundwater, more frequent and severe flooding, and even submersion.

**Number of people living in low-elevation coastal zones (LECZs, areas located 10 meters or less above mean sea level)**

- More than 6 million in Nigeria
- More than 2 million in Cameroon
- Between 0.5 and 2 million in Mauritania, Senegal, Guinea, Liberia, Benin, Angola, and Mozambique

## Change in ecosystems

**Climate change will heavily modify African ecosystems.**

It will affect many sectors of activity:

Agriculture — Livestock raising — Fishing

**At + 2 °C global warming:**

36% of freshwater fish — 7–18% of terrestrial species → **will be threatened with extinction.**

Bleaching could **destroy more than 90% of coral** along the coasts of East Africa

**25% to 50% of freshwater terrestrial and aquatic species** in the south of the continent (Namibia, Botswana, and South Africa) could suffer life-threatening climatic conditions

At +3 °C global warming, biodiversity losses of terrestrial and freshwater ecosystems could reach **50 to 75% in the south of the continent and 25 to 50% in Central Africa**

Moreover, these figures are possibly underestimates, as they do not take into account interactions between species. Indeed, the disappearance of key species can have a cascade effect on others directly dependent on them.

## Africa thus faces a challenge...

How can it successfully combine climate-change adaptation and sustainable socioeconomic development, without increasing its GHGs?

## A challenge all the more formidable because...

Africa currently contributes relatively little to global emissions. But its surge in economic and demographic growth means **it will have to invest heavily in decarbonization technologies**, because drastic emission reductions all over the world are crucial if we are to avoid an unsustainable level of global warming.

Sources used: The African Economy 2023 (AFD, La Découverte), Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), CAIT, Hoolper and Vernimmen (2021), Schilling et al. (2020), Lelieveld et al. (2016), Schewe et al. (2014).