Population and Climate Change: What are the links?

POPULATION CONNECTION

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We developed this PowerPoint to help clarify some of the main connections between population and climate change. We believe that including population dynamics into climate-related education and advocacy will help pinpoint further solutions that will make our climate interventions more successful — such as access to reproductive health care, family planning options, girls' education and gender equity.

climate@populationconnection.org

Main points

- Climate change affects everyone, but the world's fasted growing populations are the most vulnerable to climate impacts.
- Population growth contributes to climate change because each additional person causes emissions throughout their lifetime.
- A higher global population also increases the number of climate victims.
  - Affluent populations cause the overwhelming majority of global emissions.
  - Low-income populations are the most at-risk for climate impacts.

Main points

- Population size will continue to influence the extent and severity of climate change into the future. Population numbers also influence the effectiveness of climate mitigation and adaptation strategies.

- Slowing population growth through rights-based measures, such as increasing access to quality reproductive health care, will reduce emissions that cause climate change and decrease the number of climate victims.

“Demographic trends have an important connection to both the challenges and solutions to the problem of climate change, Rapid population growth exacerbates vulnerability to the negative consequences of climate change, and exposes growing numbers of people to climate risk. Population growth is also one of the drivers of growth in greenhouse gases that contribute to climate change.

Meeting people’s needs for family planning and reproductive health builds resilience to climate change impacts. Meeting family planning needs will also stem population growth, easing challenges associated with adapting to climate change impacts and reducing the growth of greenhouse gas emissions.”

- Population Action International (PAI)

Climate Change

- Climate change is the single most pressing environmental issue for the earth's natural systems, and poses threats to food security, freshwater supply, and human health.

- Climate change is being driven by a buildup of greenhouse gases, including carbon dioxide (CO_2), nitrous oxide, and methane, in the atmosphere.
    - The growth of greenhouse gas emissions is linked to various factors, including economic growth, technological change, and human population trends.

Source: IPCC 2019

Photo by Denys Argyriou on Unsplash

Climate Change

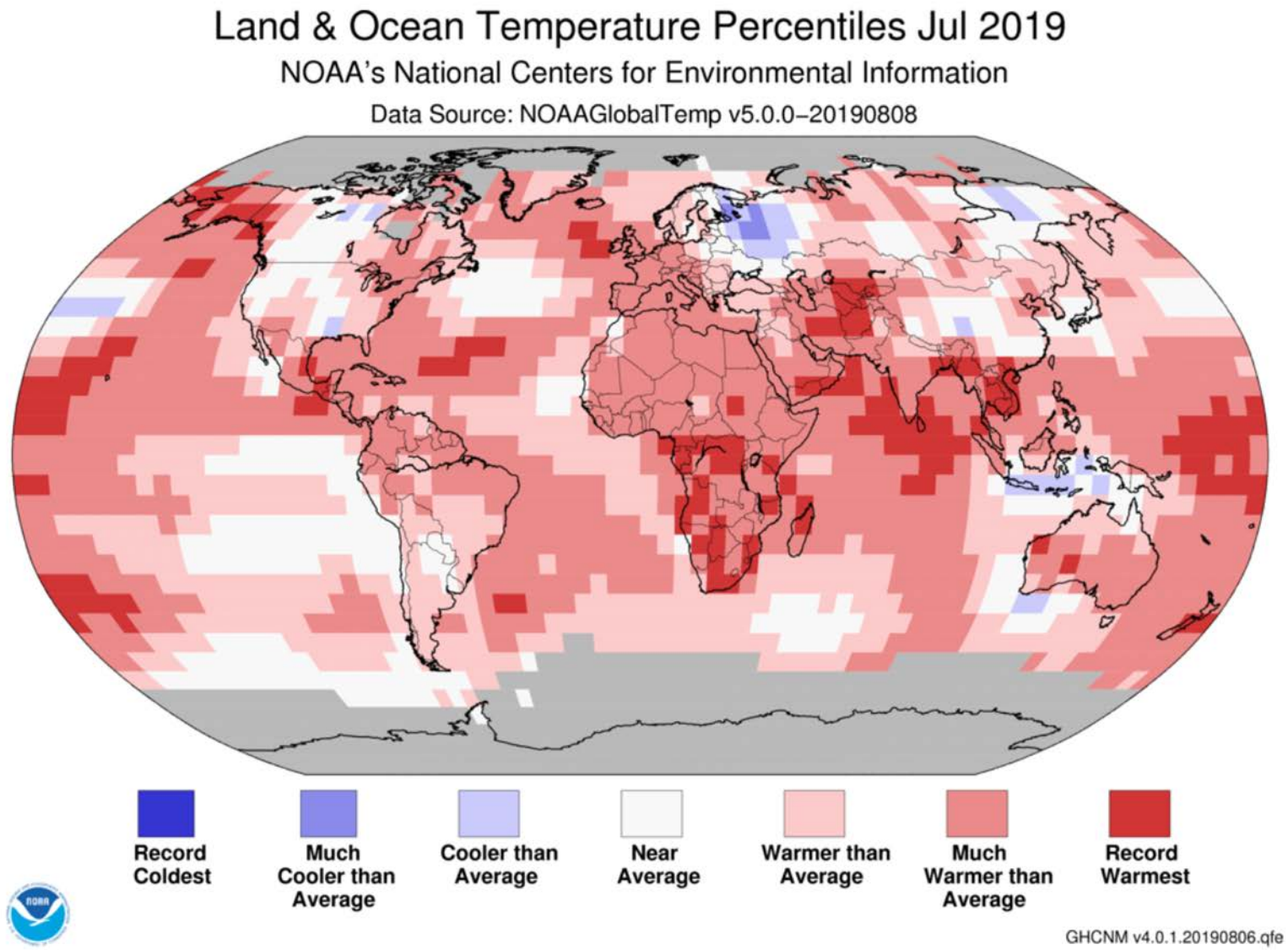
- The planet's warmest years on record were from 2015-2019.
  - Global warming beyond 1.5°C will cause large-scale environmental damage.
  - However, global anthropogenic emissions are not expected to peak by 2030.
  - Scientists estimate that climate impacts are hitting harder and earlier than assessments indicated even 10 years ago.
- The global risks from climate change are increasing.
  - Regardless of the trajectory of future emissions trends, the warming that has already resulted from emissions produced from the pre-industrial period to the present will continue for hundreds of thousands of years.
  - Any actions taken to limit and prevent further warming should be carried out to the fullest extent possible.

Source: IPCC 2019

Climate Impacts on People and Populations

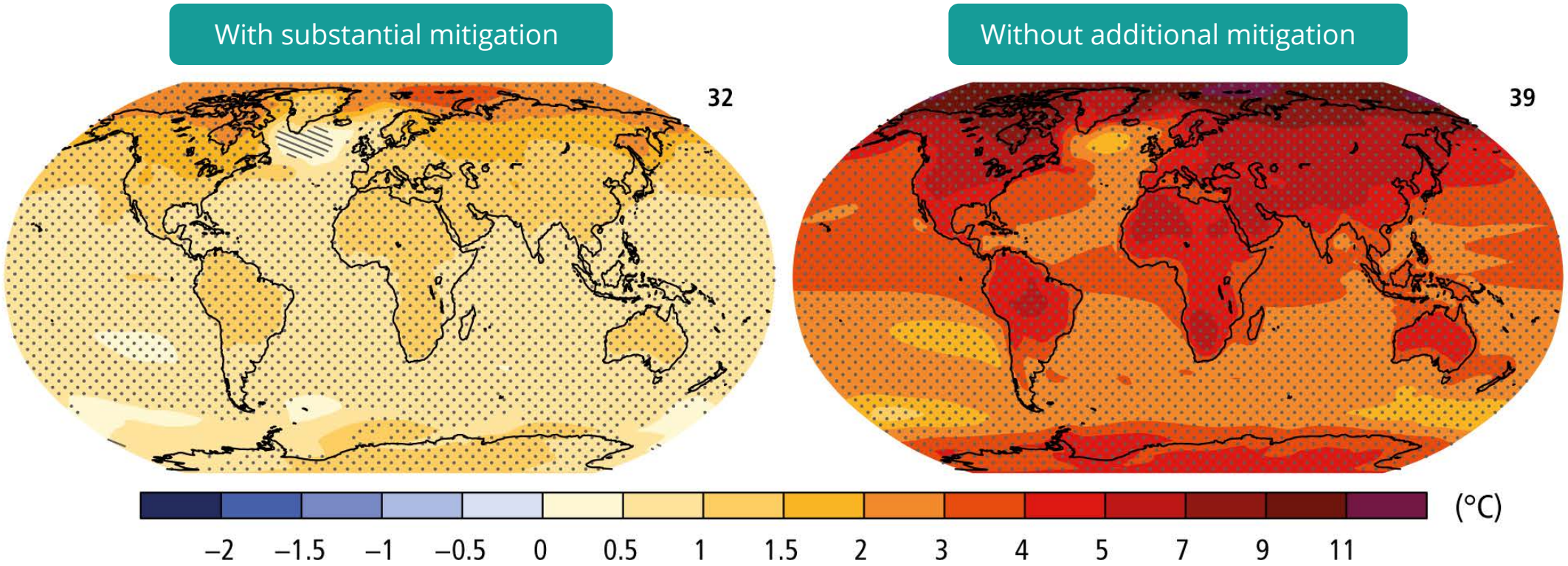
- Temperature rise
- Unpredictable precipitation
- Sea level rise
- Floods
- Glacial melting
- Destruction of marine ecosystems
- Increasing storm severity
- Increasing water stress
- Longer and more damaging wildfire season
- More destructive hurricanes
- Disruptions in food production and supply
- Droughts
- Decreased economic growth
- Growing health impacts

Source: U.S. Global Change Research Program 2019



Source: NOAA 2019, IPCC 2019

The choices we make can create different outcomes

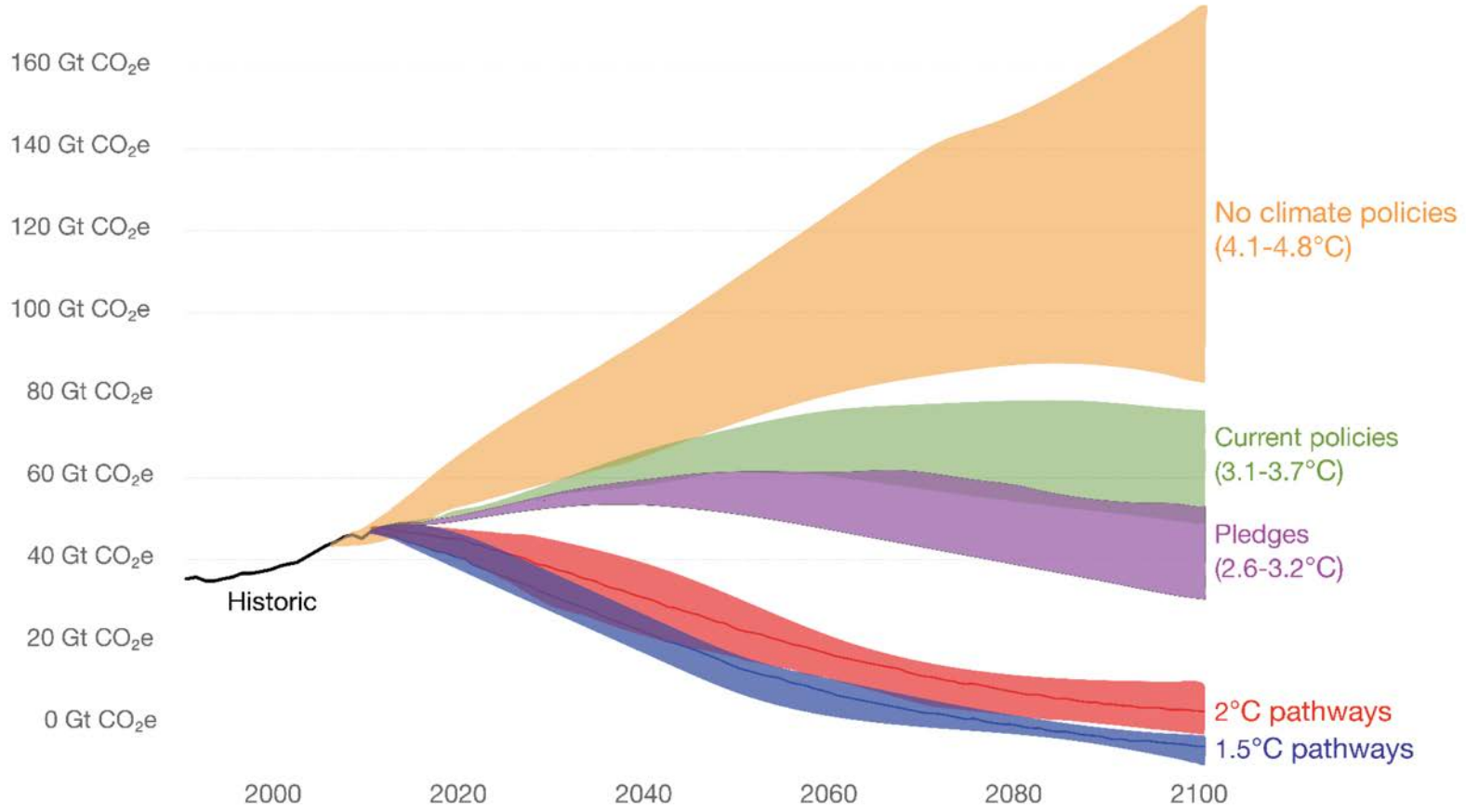


Change in average surface temperature (1986–2005 to 2081–2100)

Source: IPCC 2019

Global greenhouse gas emissions scenarios

Potential future emissions pathways of global greenhouse gas emissions (measured in gigatonnes of carbon dioxide equivalents) in the case of no climate policies, current implemented policies, national pledges within the Paris Agreement, and 2°C and 1.5°C consistent pathways. High, median and low pathways represent ranges for a given scenario. Temperature figures represent the estimated average global temperature increase from pre-industrial, by 2100.



Based on data from the Climate Action Tracker (CAT).
The data visualization is available at OurWorldinData.org. There you find research and more visualizations on this topic.

The future trajectory of climate change and its associated global impacts will depend on the level of CO_2 emissions.

Our World in Data 2019

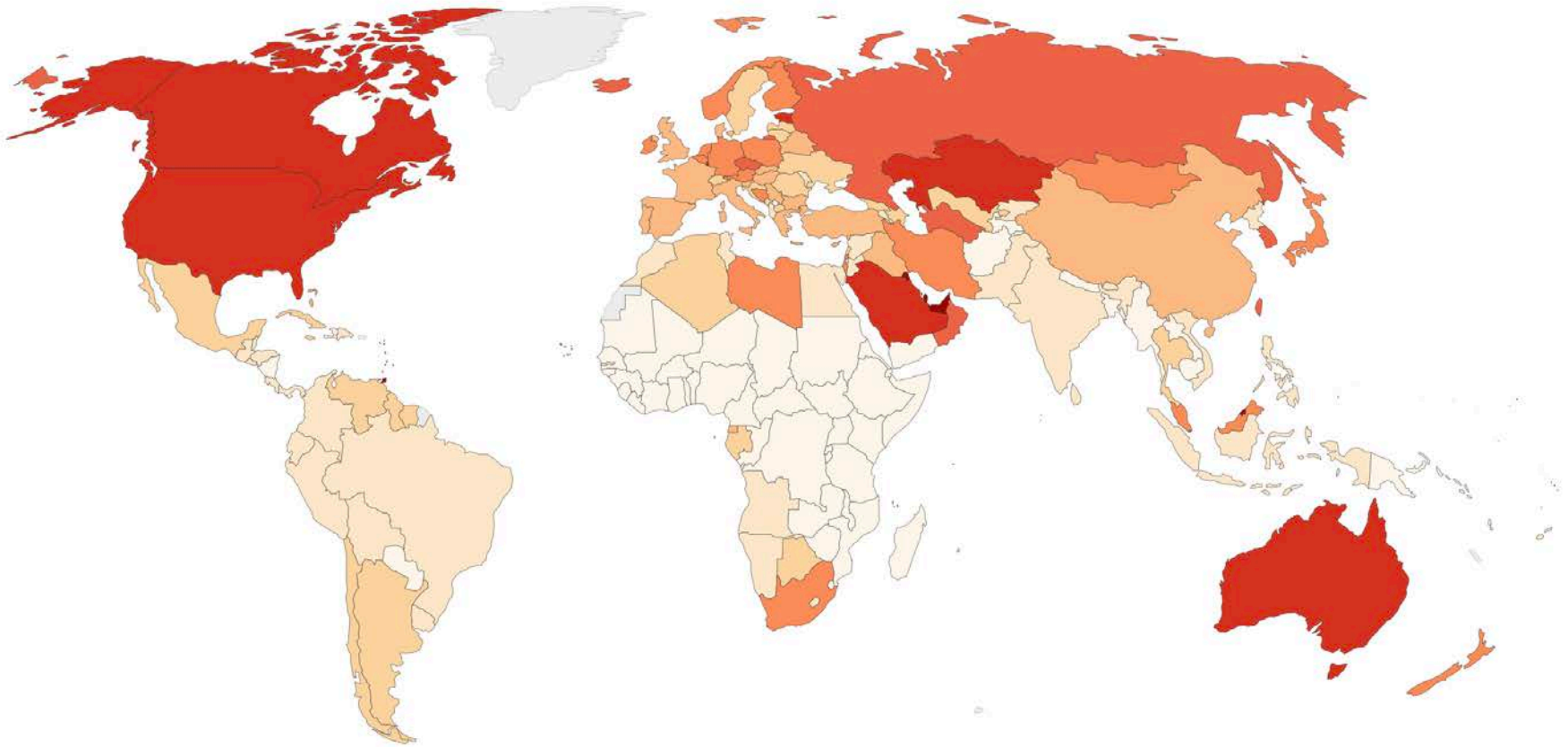
Population and Climate Change

- Resource use and consumption patterns act as primary drivers of global emissions.
  - Each person causes emissions throughout their lifetime, but in different ways and at varying levels.
- There is a clear relationship between income and per capita CO_2 emissions.
  - This means that many industrialized nations such as the U.S. and Canada contribute the most to climate change.
  - High-consumption lifestyles and inefficient/wasteful production practices in high-income countries result in significantly higher per capita emissions rates than in middle and low-income countries, where the majority of the world's population growth is expected to occur.

CO_2 emissions per capita, 2017

Average carbon dioxide (CO_2) emissions per capita measured in tonnes per year.

Our World in Data



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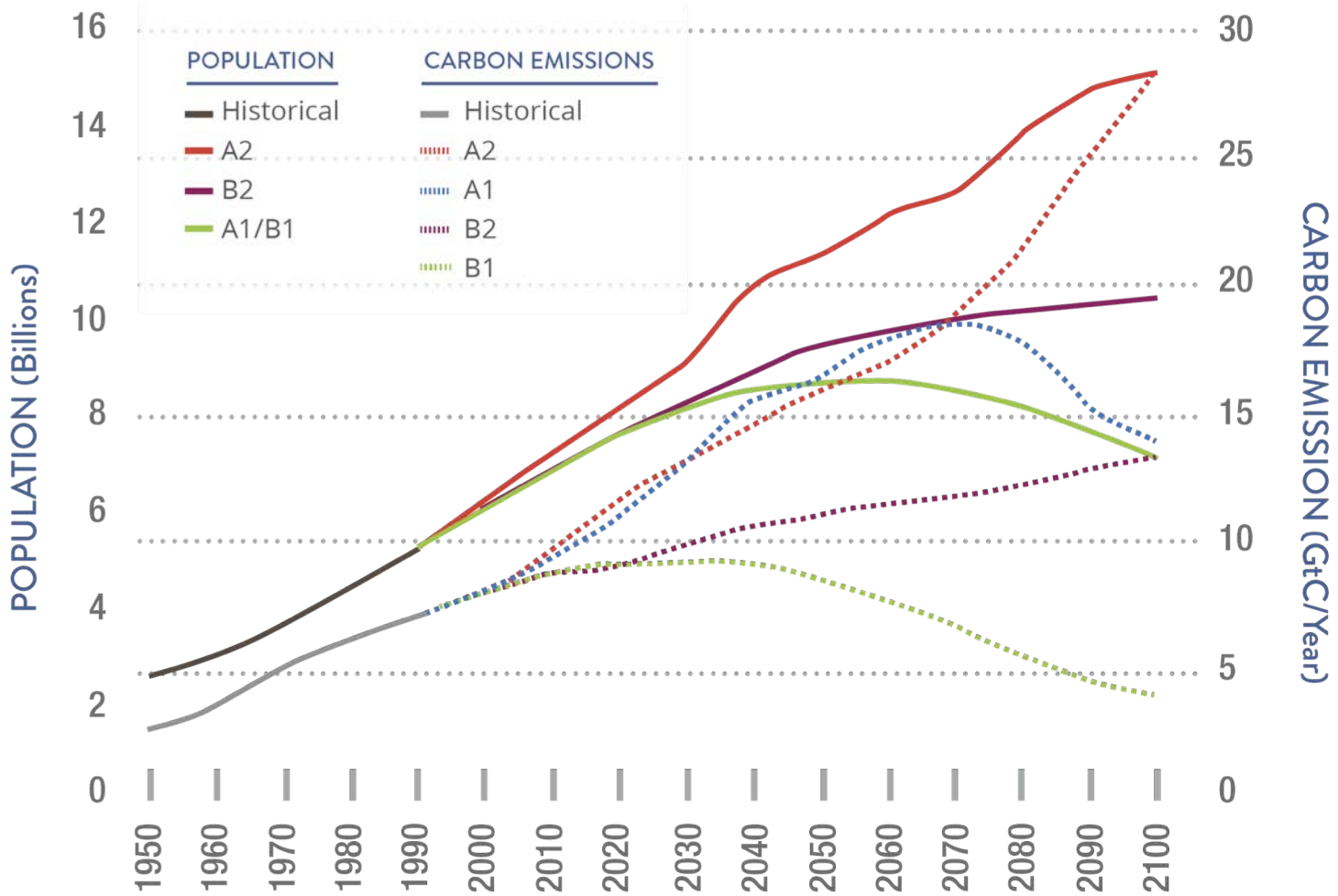
Source: OWID based on CDIAC; Global Carbon Project; Gapminder & UN

Population and Climate Change

- However, population growth is an important diver of emissions, even when it occurs in middle/low-income settings.
    - The world adds over 80 million people to the planet each year, with most of this growth happening where people are already vulnerable to the impacts of a changing climate.
- In future climate scenarios generated by the IPCC, higher population projections result in higher greenhouse gas emissions.
- IPCC research which examines the effect of different population futures on economic growth and energy use and indicates that slower population growth has the potential to significantly reduce future greenhouse gas emissions.

Source: IPCC Report on Climate Change and Population, 2018 Synthesis Report

Population Changes and Carbon Emissions Under IPCC SRES Scenarios

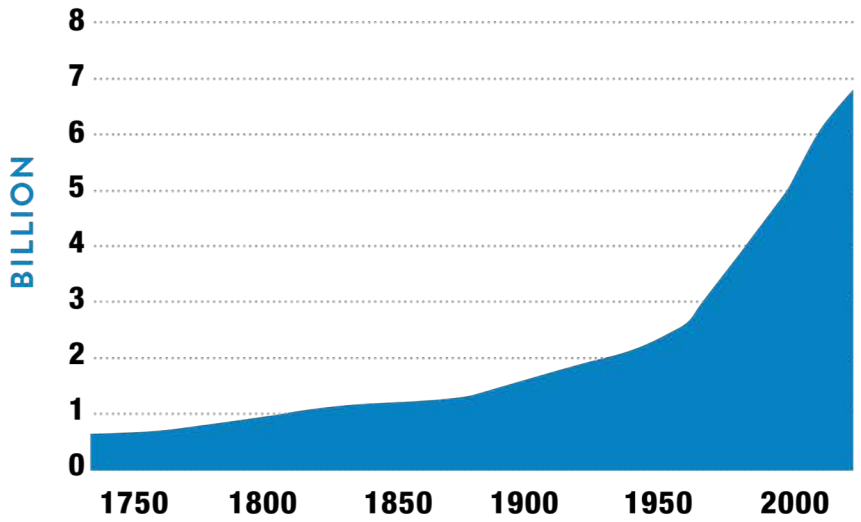


- The IPCC groups climate scenarios into four families (A1, A2, B1, B2), each making different assumptions about economic growth, technological change, and population growth.
- Population projections vary widely, from a low of 7.1 billion to a high of 15 billion in 2100.
- Climate change models associated with these projections show that higher population growth will result in higher emissions.
- Even in scenarios of low population growth, economic growth and technological change can result in high emissions.

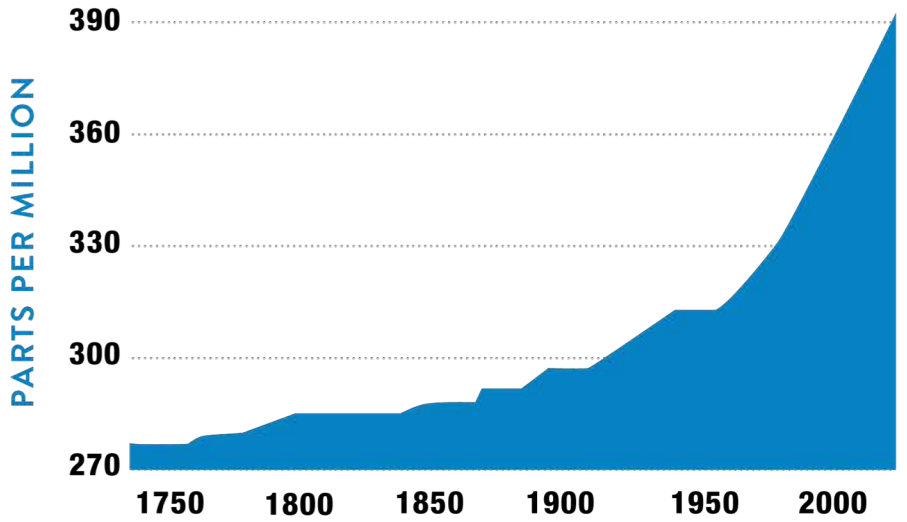
Source: IPCC, Population Action International (PAI) 2012

Population and $C0_2$ Emissions, 1750-2015

World Population

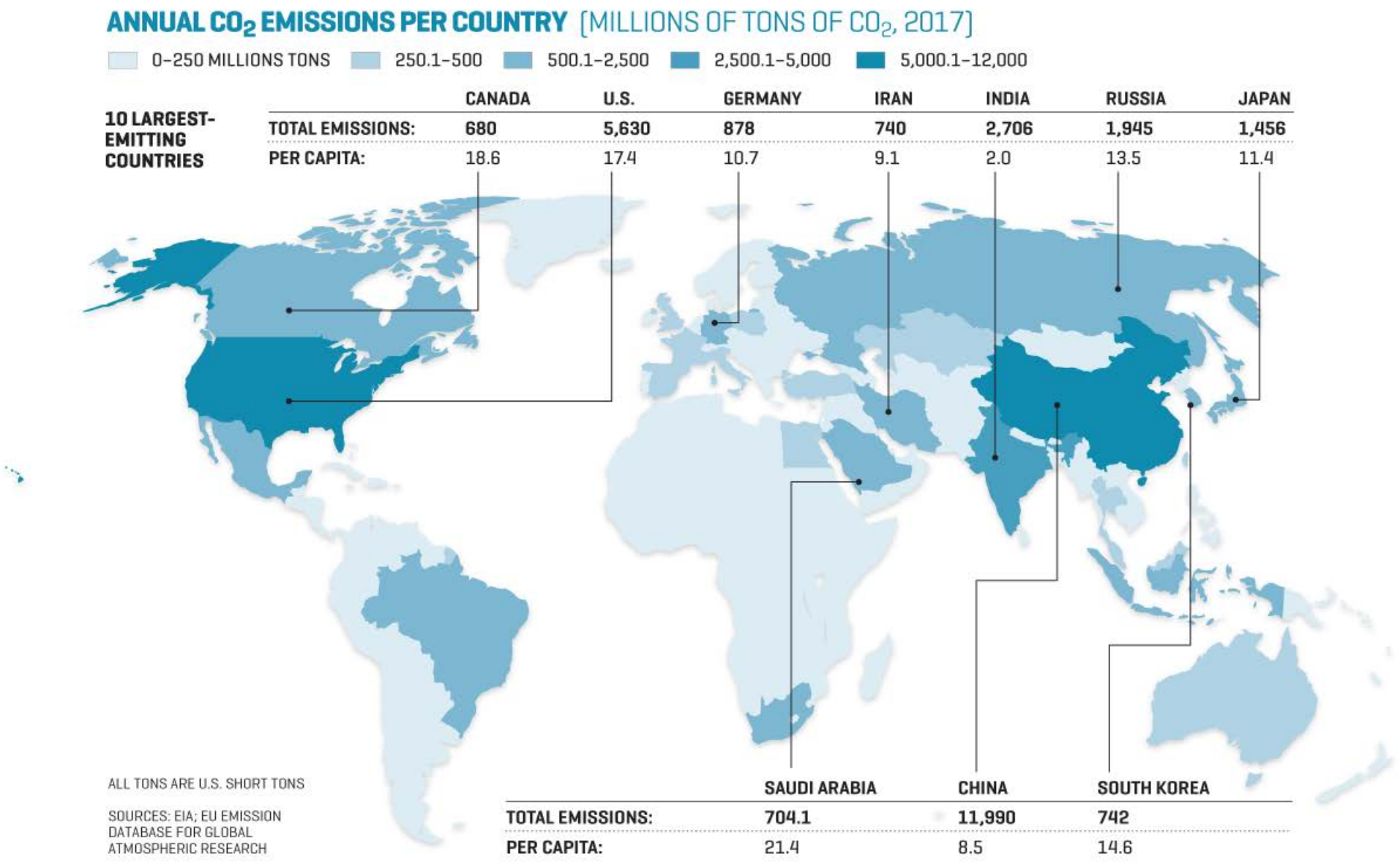


Carbon Dioxide ($C0_2$)

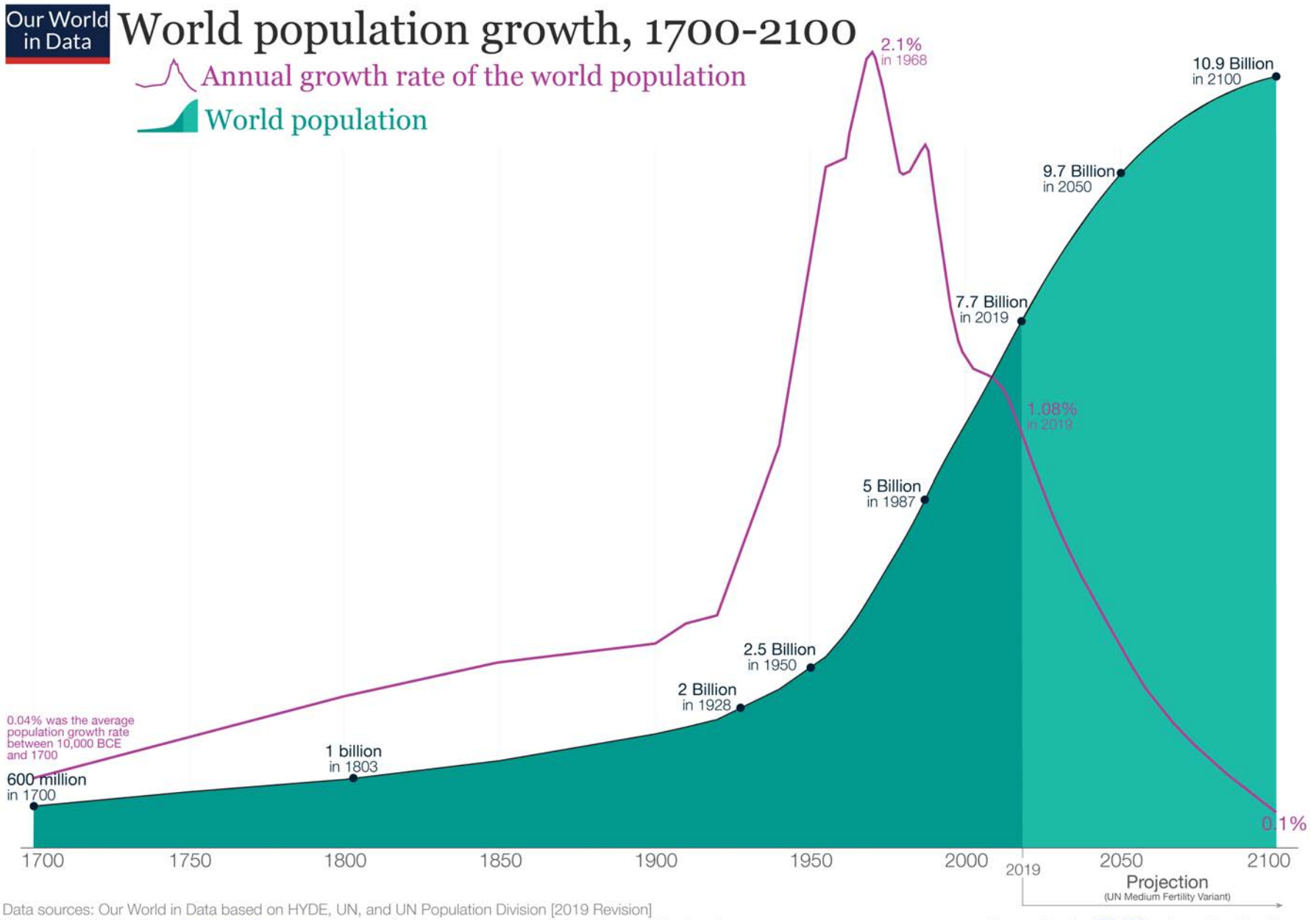


Historically, CO_2 emissions have increased alongside population growth.

Source: Population Matters 2019, United Nations 2017



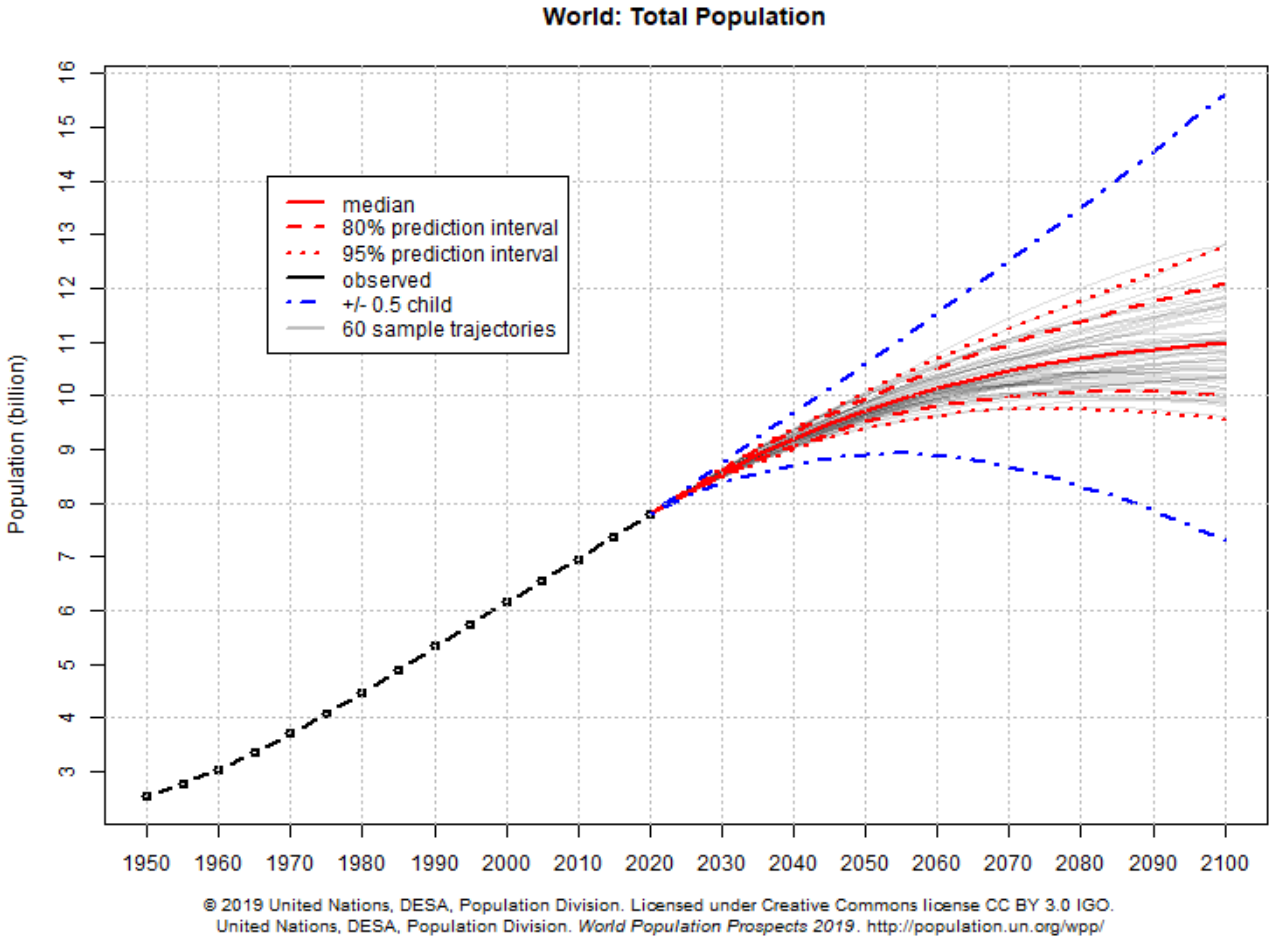
Source: EU Emission Database for Global Atmospheric Research, in Fortune 2018



Data sources: Our World in Data based on HYDE, UN, and UN Population Division [2019 Revision]
This is a visualization from OurWorldinData.org, where you find data and research on how the world is changing.

Comparison of world population projections

Projections from 2015 onwards depict different fertility variants.



Source: UN Population Division 2019 revision; HYDE; Our World in Data 2019

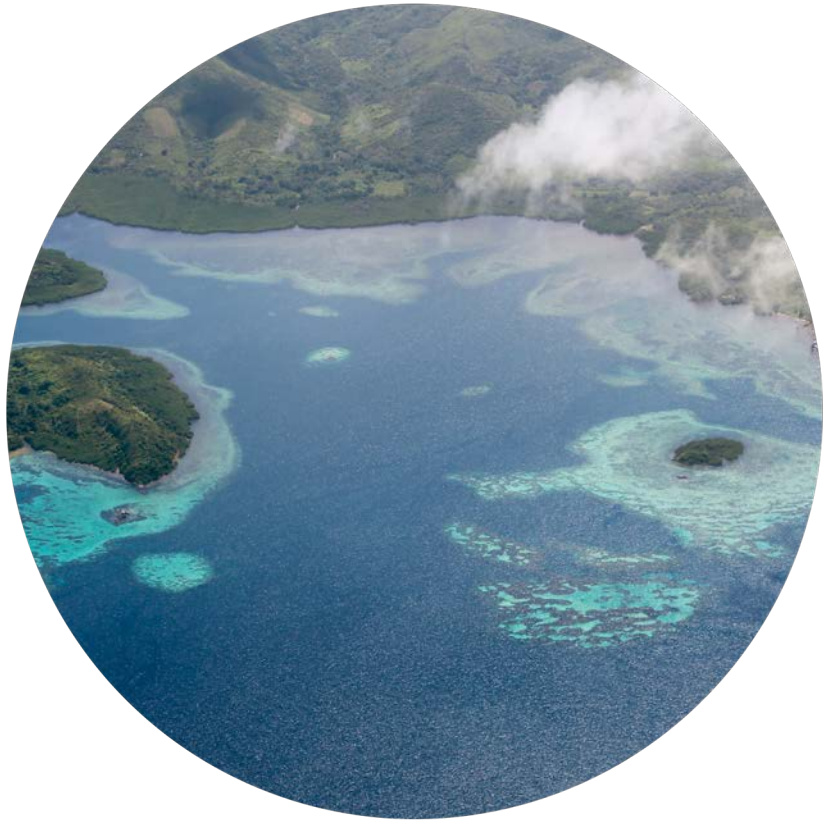
Future Population Projections

- The world's population is currently estimated at 7.8 billion people.
- The UN World Population Prospects for 2019 projects, with 95% certainty, that the population will reach between 8.5 and 8.6 billion in 2030, between 9.4 and 10.1 billion in 2050, and between 9.4 and 12.7 billion in 2100.
- The UN's medium and high projections do **not** show that human population growth will plateau by the end of this century.
- Two-thirds of the projected growth of the human population through 2050 will be driven by current age structures, a phenomenon known as population momentum:
  - This means that growth would occur even if childbearing in high fertility countries today were to fall immediately to around 2 births per woman.

Source: UN World Population Prospects: The 2019 Revision

Population Dynamics and the Environment

- The world's 47 Least Developed Countries (LDCs) are projected to grow the fastest. Almost all LDCs are located in Sub-Saharan Africa, which will add more than 1 billion people between 2020 and 2050, and will continue to grow beyond 2100.
- With the UN, governments of the LDCs have gauged their vulnerabilities to climate change in order to identify needs and appropriate actions in National Adaptation Programmes of Action (NAPAs).
  - As of 2011, 37 out of 41 NAPAs had identified rapid population growth as a key factor worsening climate vulnerability.



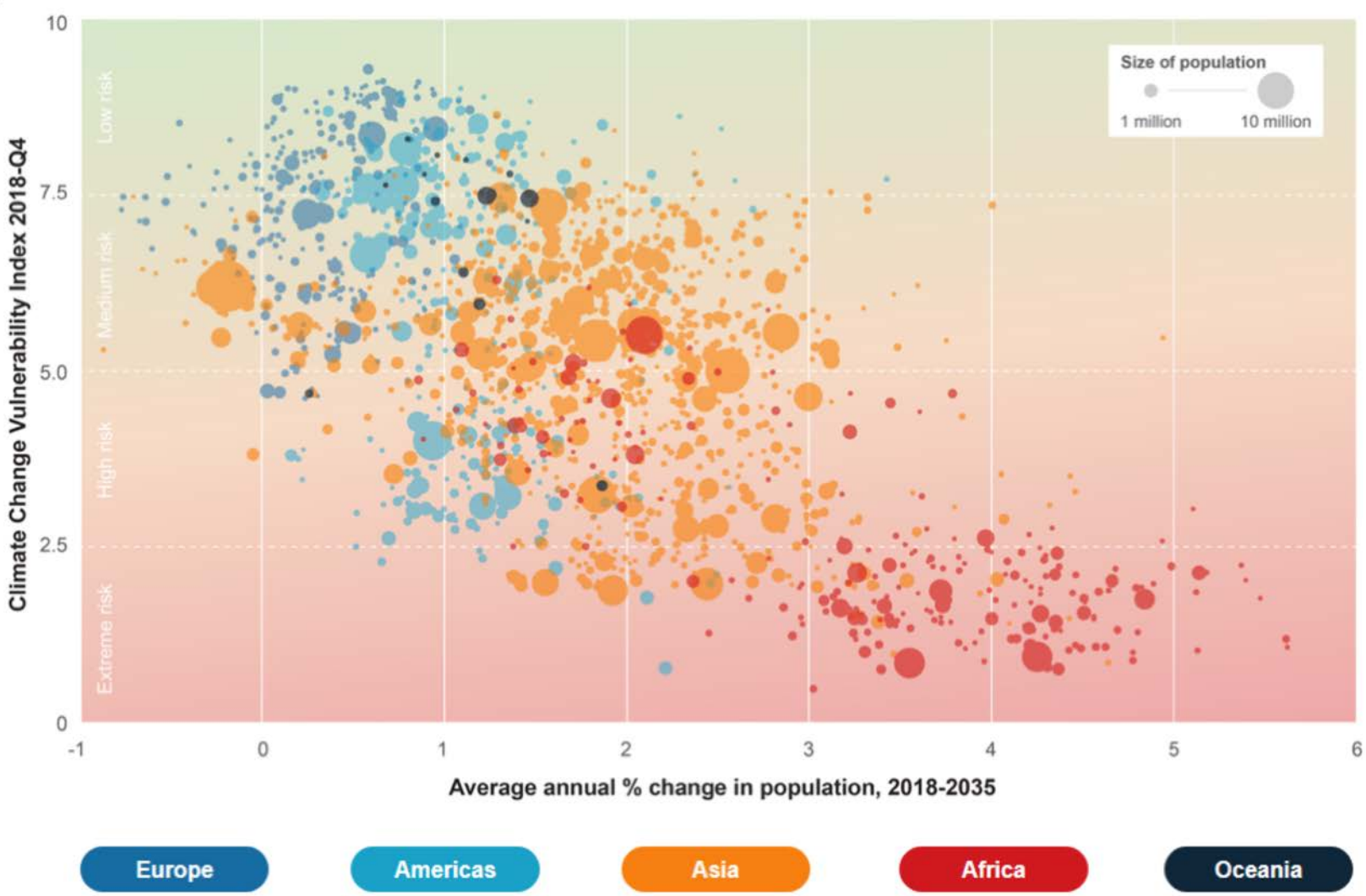
Source: UN Population Prospects 2019, PAI 2012

Population Dynamics and the Environment

- Population growth puts stress on local environments, especially by degrading and depleting resources.
  - This challenges sustainable development and climate change adaptation.
- Rapid population growth worsens chronic poverty and further undermines women's empowerment, livelihoods, access to education, maternal and child health, and the development of infrastructure.
- The fact that many developing countries are experiencing rapid population growth means that more people will be exposed to climate impacts who lack the resources necessary to quickly adapt and recover.

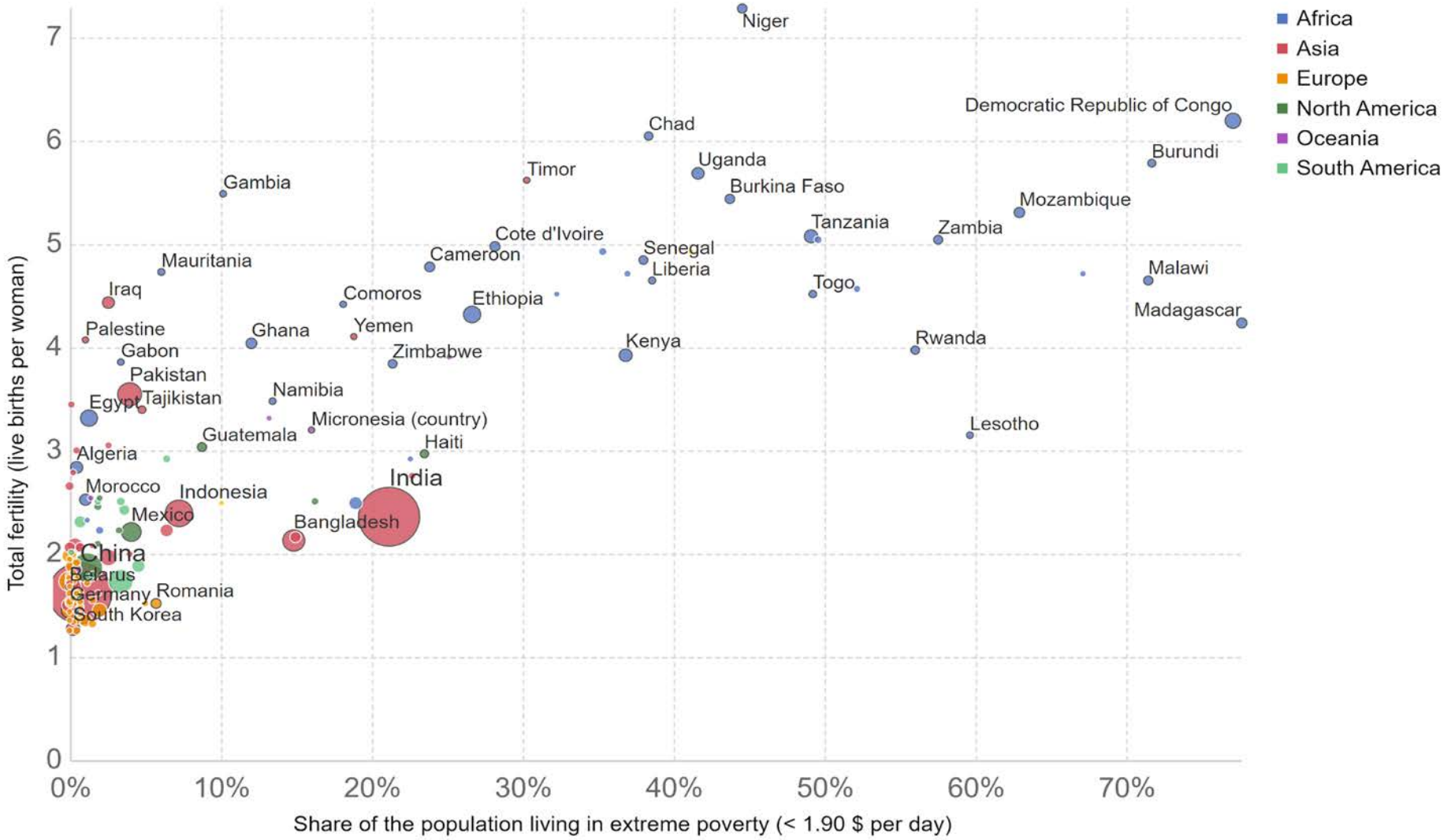
Source: PAI 2012; UN World Population Prospects 2019 Revision

Climate Vulnerability Increases with Population Growth



Source: UN Department of Economic and Social Affairs: Population Dynamics

Fertility rate vs the share living in extreme poverty, 2015

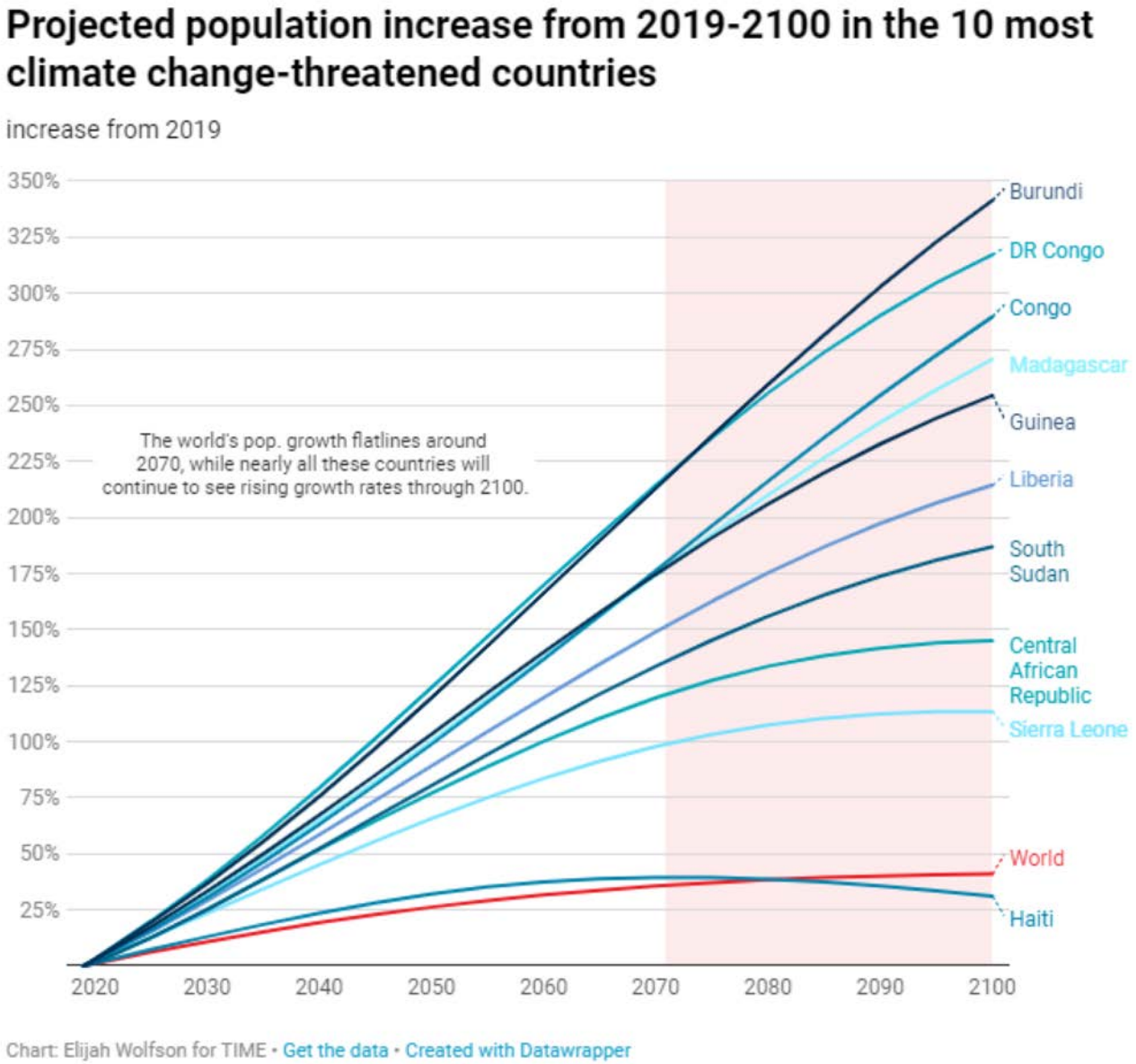


Source: UN Population Division (2017 Revision), World Bank

Population and Climate Vulnerability

- The links between population growth and climate vulnerability are visible around the world.
  - In Pakistan, population pressures have crowded people into flood-prone areas.
  - In Malawi, droughts and floods reduce agricultural yields.
  - 9 out of the 10 most climate vulnerable countries are in sub-Saharan Africa, which is projected to double in population by 2050.

Northern Pakistan. Adobe Photos



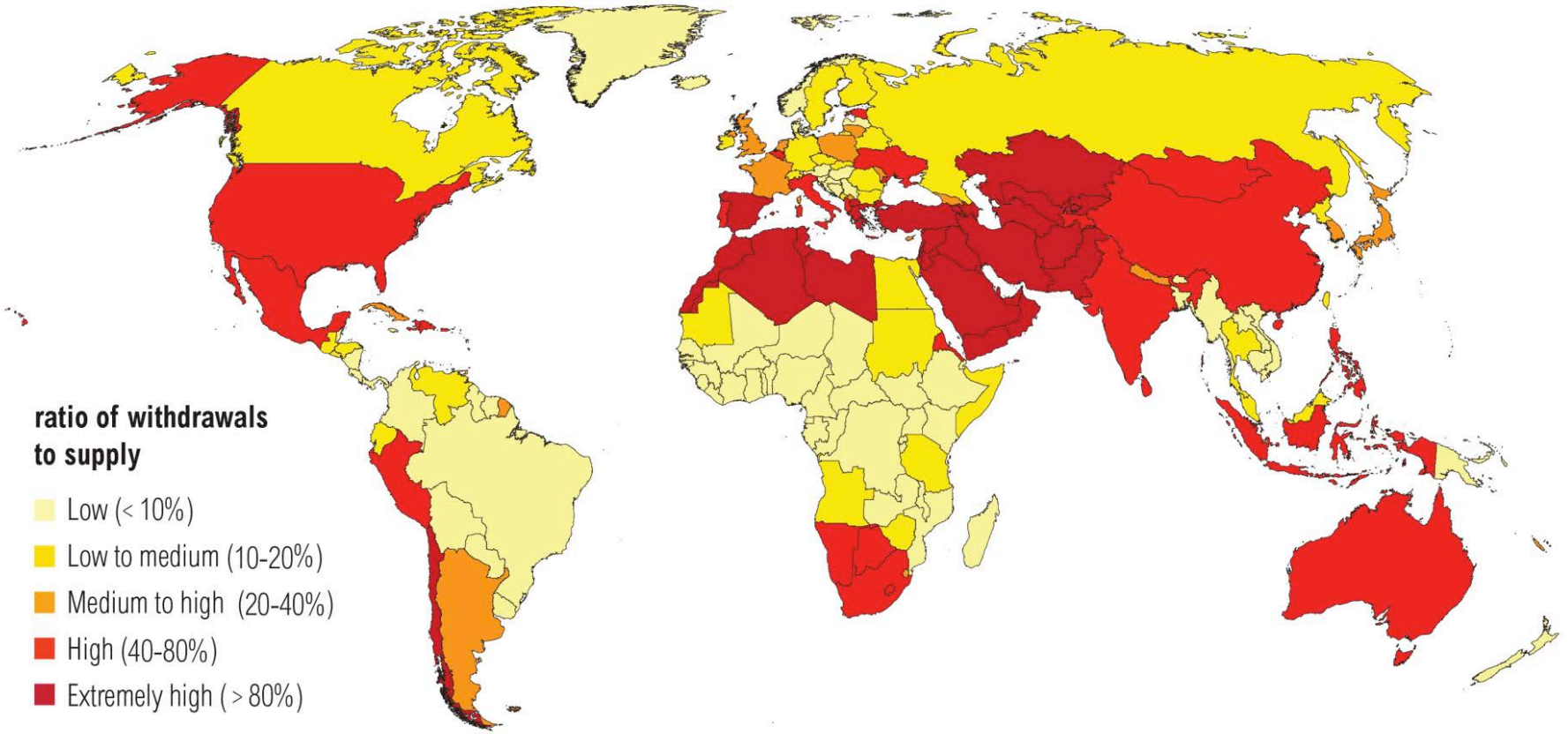
Source: Time 2019

Population and Climate Vulnerability

- Population pressures reduce the availability of fresh water.
    - Currently, 1.8 billion people across 17 countries—nearly ¼ of the global population—live in regions of extremely high water stress.

Source: World Resources Institute 2020

Water Stress by Country: 2040



NOTE: Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

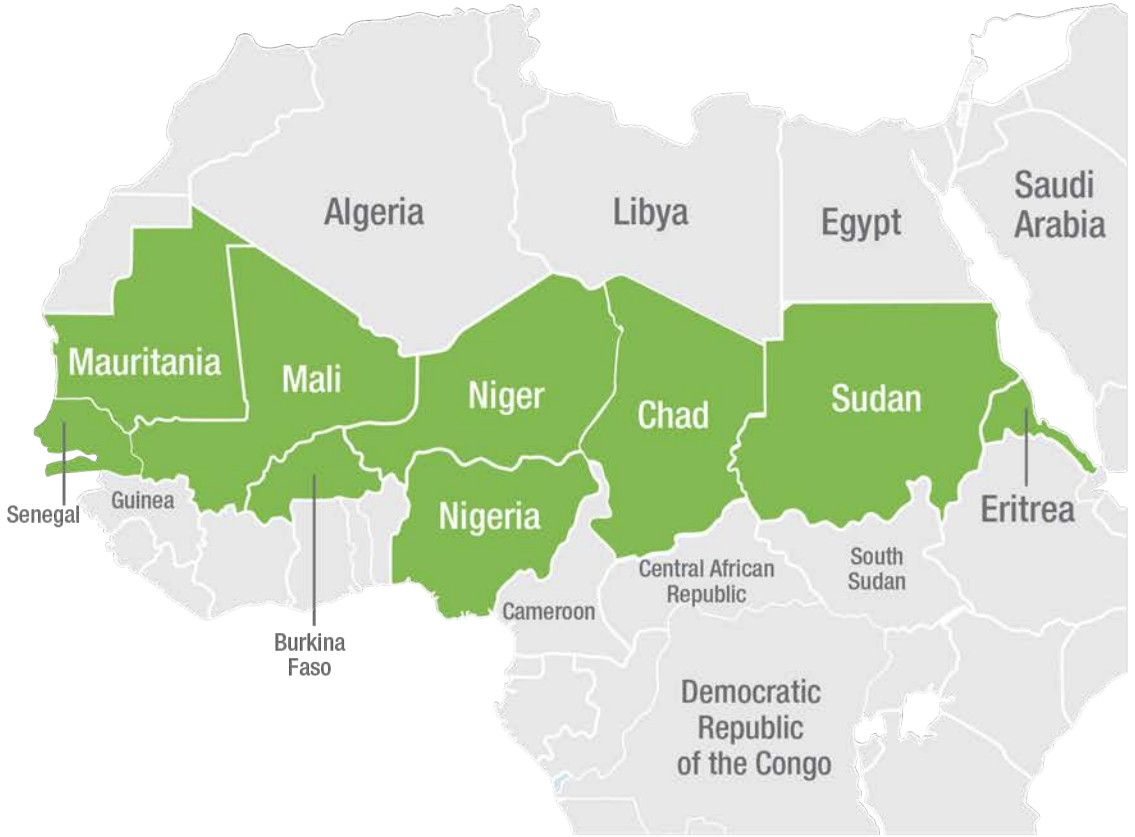
For more: ow.ly/RiWop

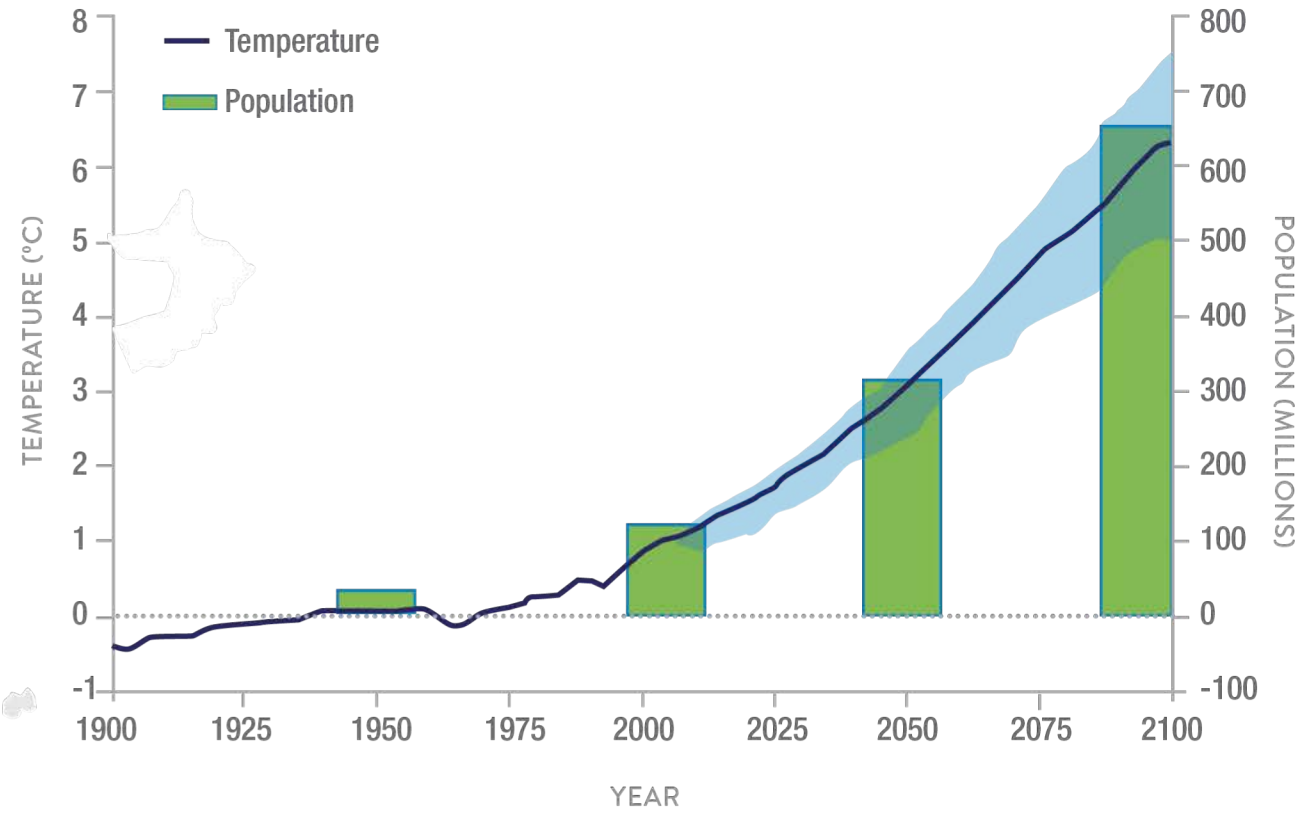
WORLD RESOURCES INSTITUTE

Population and Climate Vulnerability in the Sahel

- In the Sahel region of sub-Saharan Africa, 100–200 million people will likely lack reliable food supplies in the next 30–40 years.
- The Sahel region has grown from 31 million people in 1950 to 100 million in 2013, and will likely reach over 300 million by 2050 and 600 million by 2100.
- Temperatures here are rising 1.5 times faster than the global average, and future projections show an increase of 3°C to 5°C above 2013 levels by 2050.
  - Further warming could reach 8°C above the same levels by 2100.

Source: Bixby Center for Global Reproductive Health



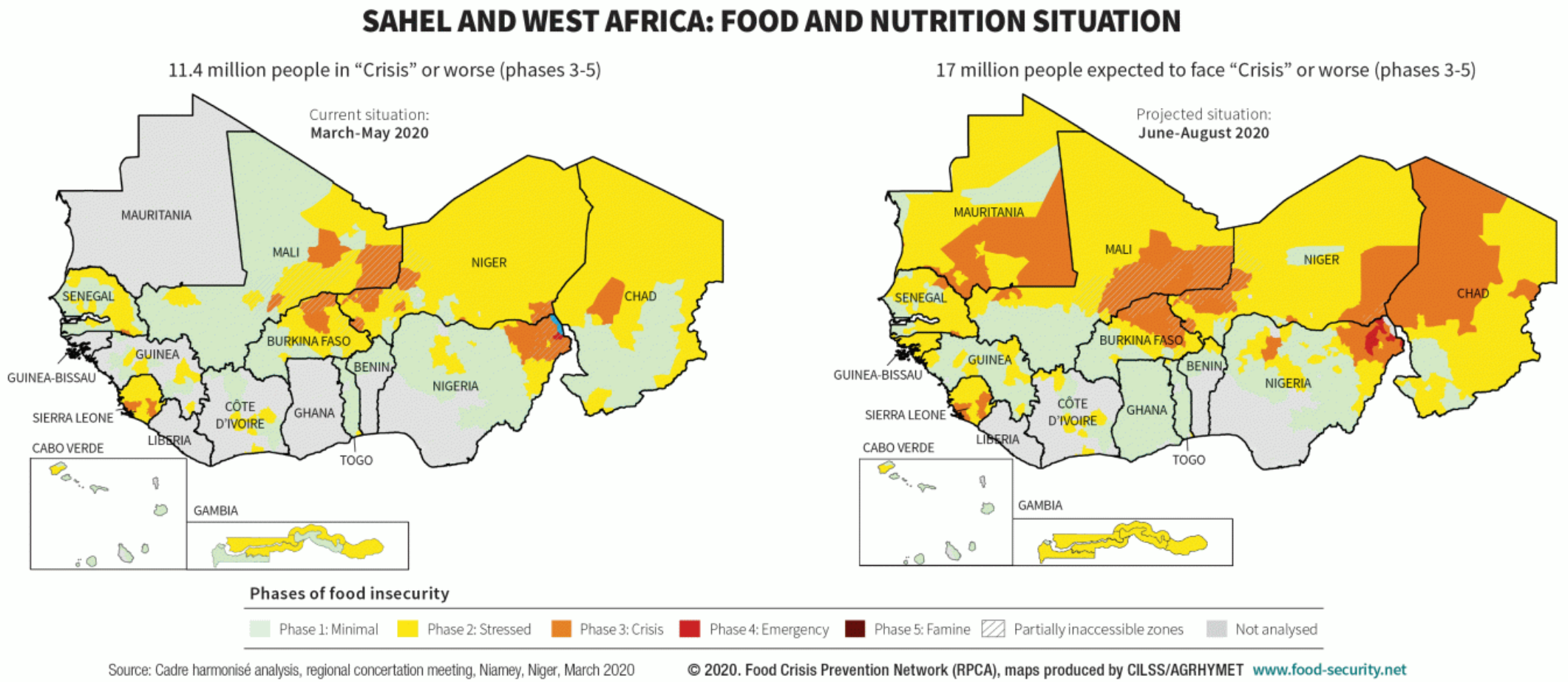


Source: Bixby Center for Global Reproductive Health, OASIS Initiative

Population and Climate Vulnerability in the Sahel

- Climate change is causing increasingly frequent droughts and floods, which undermine food production in a region where over 80% of farmland is already degraded.

Source: Bixby Center for Global Reproductive Health



- Already, 33 million people in the Sahel are food insecure.
- Declining food production drives farmers to search further for arable land, increasing the likelihood of conflict.

Source: World Economic Forum 2019. USAID West Africa, OCHA W&C Africa, Delegation UE Niger and 6 others

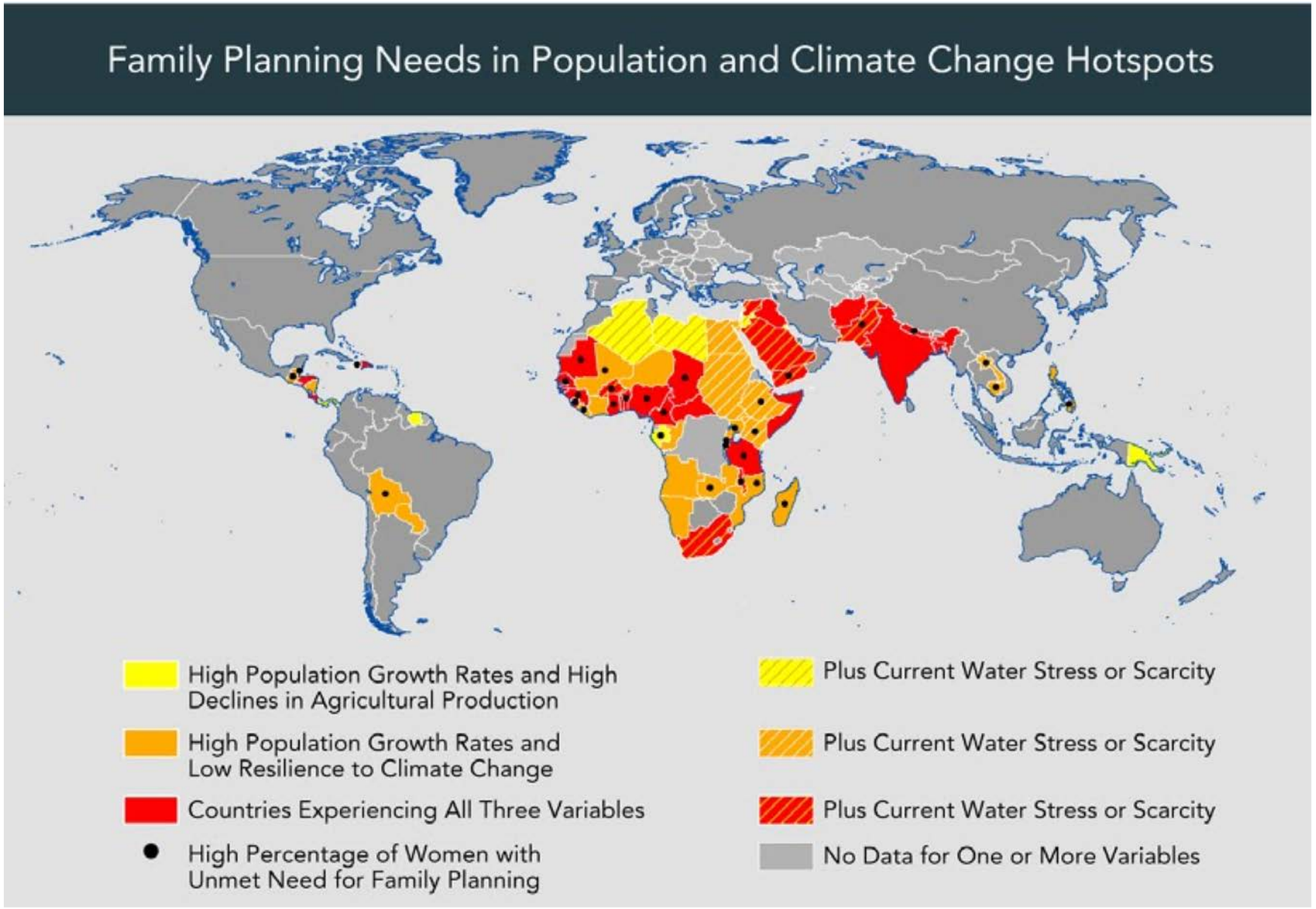
Population and Climate Vulnerability in the Sahel

- Population growth hinders development by increasing hunger, resource use, greenhouse gas emissions, and habitat destruction.
- Investments in sustainable development—including education, health care, and women's empowerment—will help build resilience and adaptive capacity for all populations.
    - Increasing access to comprehensive reproductive health care is one important solution to, and adaptation strategy for, climate change.

Source: UN Commission on Population and Development , Bixby Center for Global Reproductive Health

Solutions Through Reproductive Health

Worldwide, the same regions that experience high fertility, low economic status, and high climate vulnerability also have a high unmet need for contraceptives and reproductive health services.



Source: PAI 2013

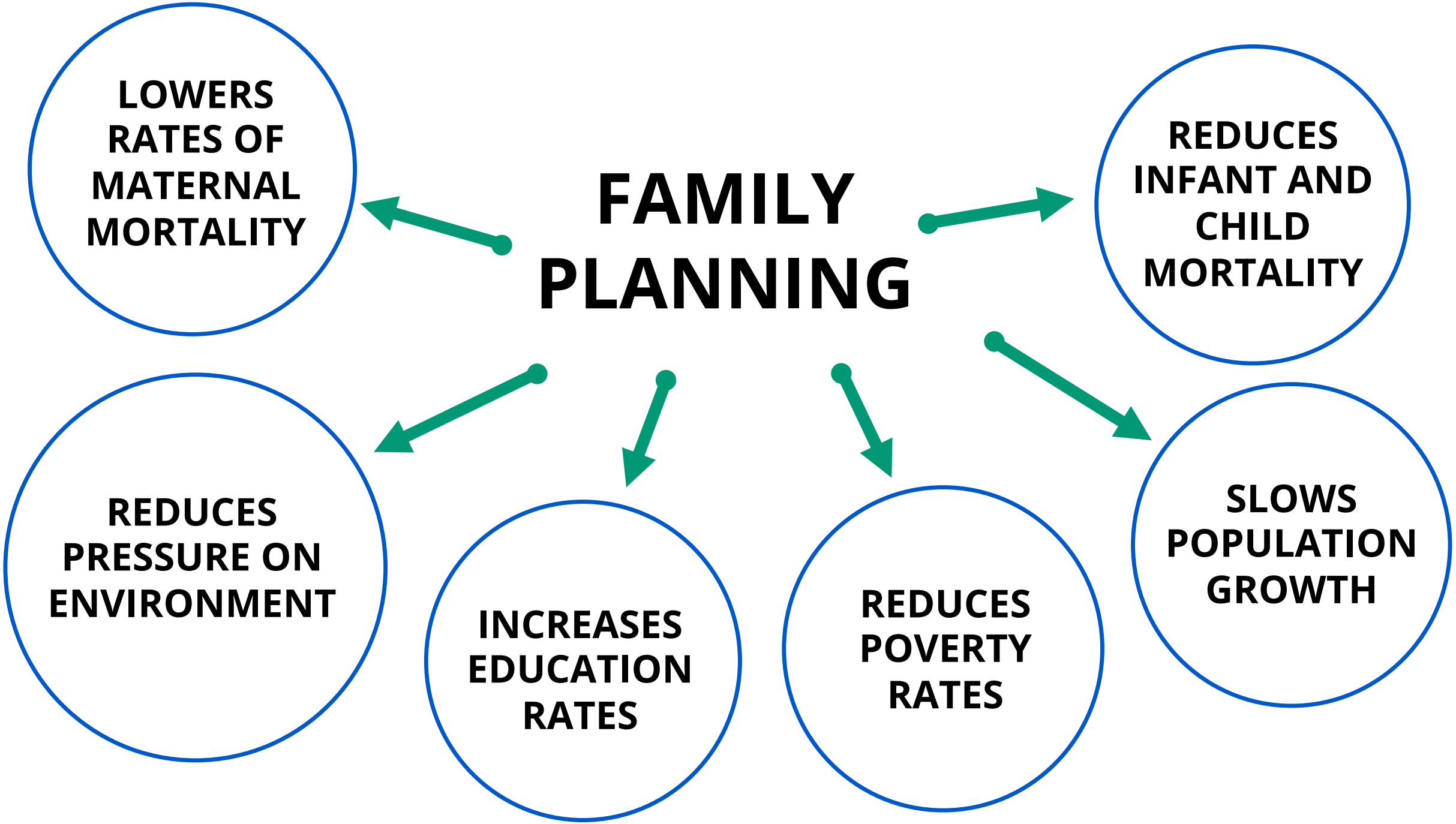
Reproductive Health in the Sahel

- In much of the Sahel, the use of contraceptives is below 10%.
  - Recent studies indicate that only 5% of Niger's married women between the ages of 15-49 use modern contraceptives, and that 20% have expressed an unmet need for family planning.
- While several countries, including Burkina Faso and Niger, have adopted policies to reduce fertility, lack of political will remains a challenge.
- Social and cultural norms, gender inequities, and some religious interpretations negatively impact access to and use of family planning services.

Source: Bixby Center for Global Reproductive Health

Solutions Through Reproductive Health

- Access to sexual and reproductive healthcare can influence population dynamics through voluntary fertility reductions and lower infant and maternal mortality rates.
- Quality, comprehensive reproductive health care:
  - increases the health, welfare, and life expectancy of women and children,
  - advances individual rights,
  - reduces poverty,
  - and slows population growth.
- Together, these benefits help to strengthen environmental sustainability and state stability.


FAMILY PLANNING
LOWERS RATES OF MATERNAL MORTALITY
REDUCES INFANT AND CHILD MORTALITY
REDUCES PRESSURE ON ENVIRONMENT
INCREASES EDUCATION RATES
REDUCES POVERTY RATES
SLOWS POPULATION GROWTH

Solutions Through Reproductive Health

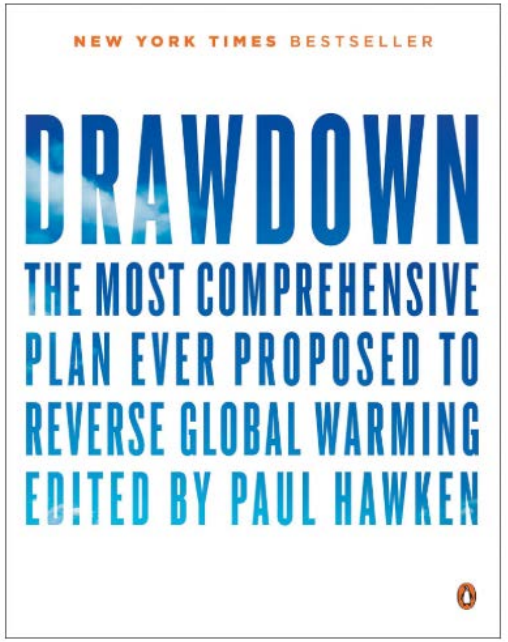
- Meeting the global unmet need for family planning services through investments in reproductive health can help slow climate change.
- Greater investments in family planning and girls' education could result in emissions reductions of up to 85 gigatons of carbon dioxide between 2020 and 2050.
  - That's equivalent to removing around 22,000 coal-fired power plants!

Source: Drawdown 2020

Selection of reproductive health supplies. Photo by Reproductive Health Supplies Coalition on Unsplash

Solutions Through Reproductive Health

- Project Drawdown (2020) offers one of the most comprehensive and realistic sets of available solutions to climate change.
  - The nonprofit produces research which is based on the work of scientists and researchers around the world, across many sectors, from finance to climate science.
  - In the book, solutions are presented and ranked on their potential impact on addressing climate change.
  - The rankings are based on projected emissions impact globally.



Individual Solutions

The rankings shown here are based on projected emissions impact globally. The relative importance of a given solution can differ significantly depending on context and particular ecological, economic, political, or social conditions.

Scenario 1

Increasing health and education ranks second out of 76 climate solutions!

Overall Ranking	Solution	**TOTAL CO_2-eq (GT)** Reduced/ Sequestered (2020-2050)	**Net First Cost** To implement solution (Billion $US)	**Net Lifetime Cost** To operate solution (Billion $US)	**Net Lifetime Profit** other implementation & operation (Billion $US)
1	Reduced Food Waste	87.4	–	–	–
2	Health and Education	85.4	–	–	–
3	Plant-Rich Diets	65.0	–	–	–
4	Refrigerant Management	57.7	–	600	–
5	Tropical Forest Restoration	55.4	–	–	–
6	Onshore Wind Turbines	47.2	800	-3,800	–
7	Alternative Refrigerants	43.5	–	–	–
8	Utility-Scale Solar Photovoltaics	42.3	-200	-12,900	–
9	Improved Clean Cookstoves	31.3	100	1,900	–
10	Distributed Solar Photovoltaics	27.9	400	-7,800	–

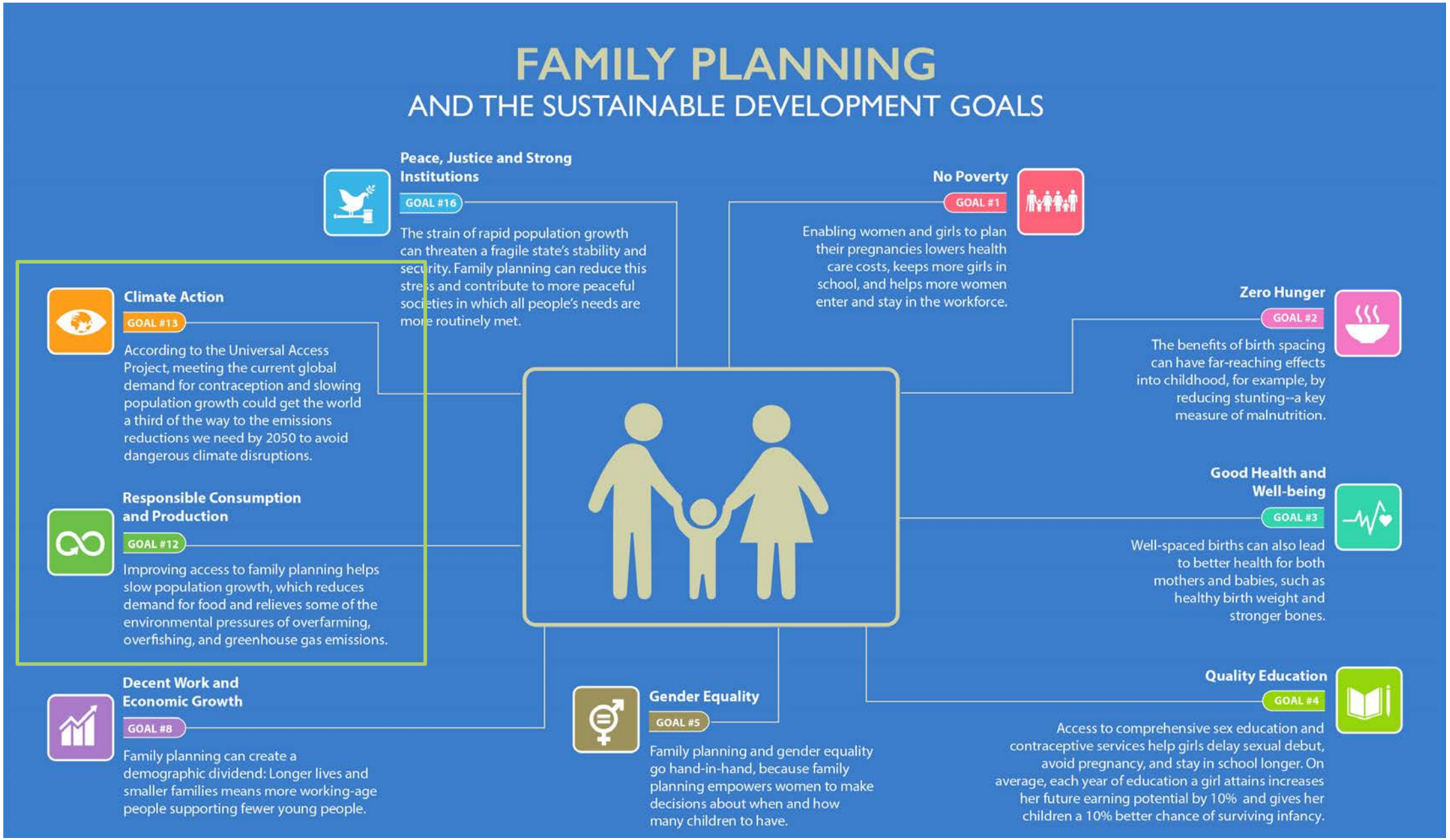
Source: The Drawdown Review 2020

Solutions Through Reproductive Health

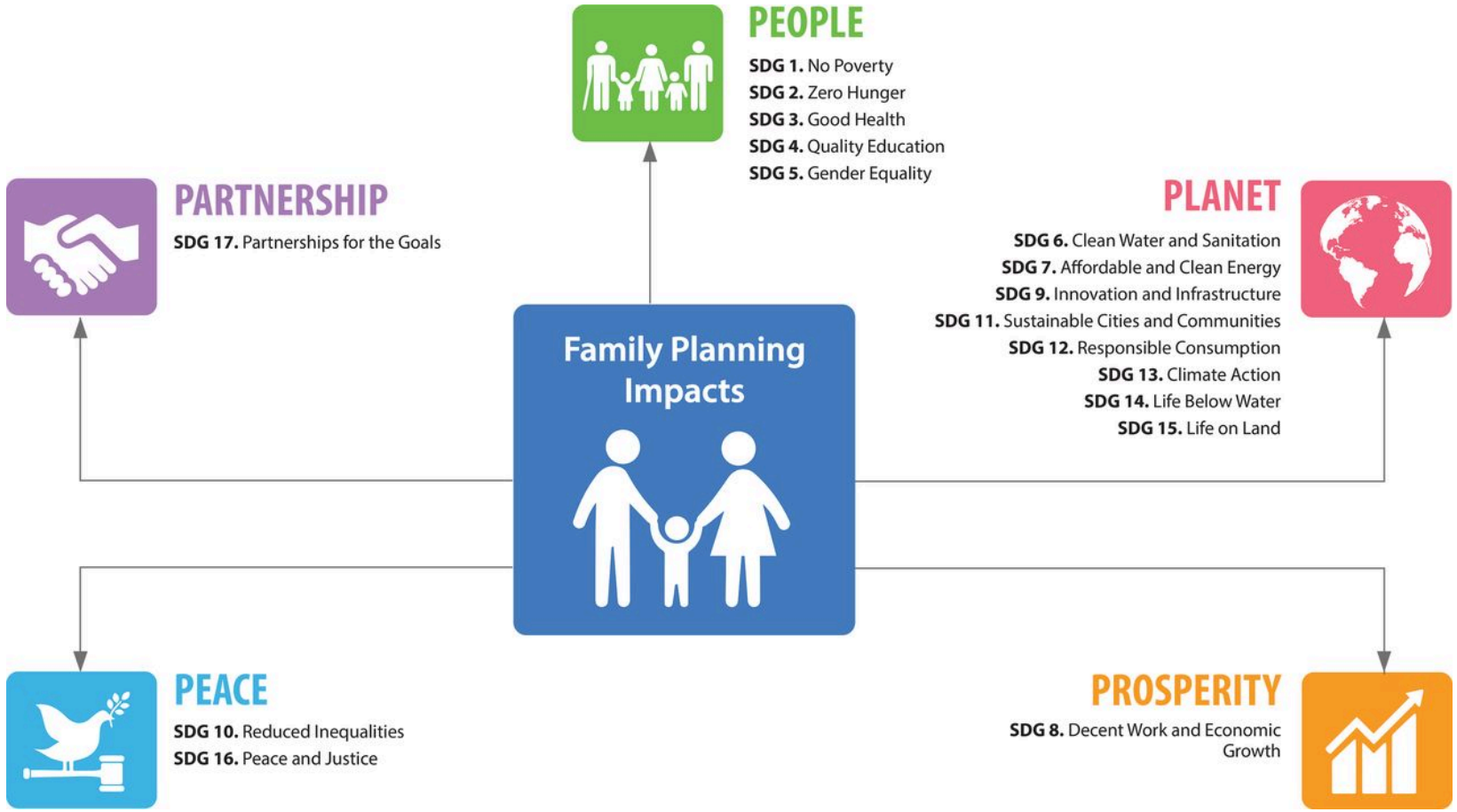
- When education levels rise for women and girls, they gain political and economic power.
  - Higher levels of education afford more options for formal sector employment.
  - More resources become available to help women and girls choose when and how to start a family.
  - Women who are educated tend statistically to have fewer, healthier children.
- Low-income populations face the biggest barriers to getting an education and using family planning.
  - This is largely because of limitations from cost, stigma, or policies.

Photo by Taylor Wilcox on Unsplash

FAMILY PLANNING
AND THE SUSTAINABLE DEVELOPMENT GOALS



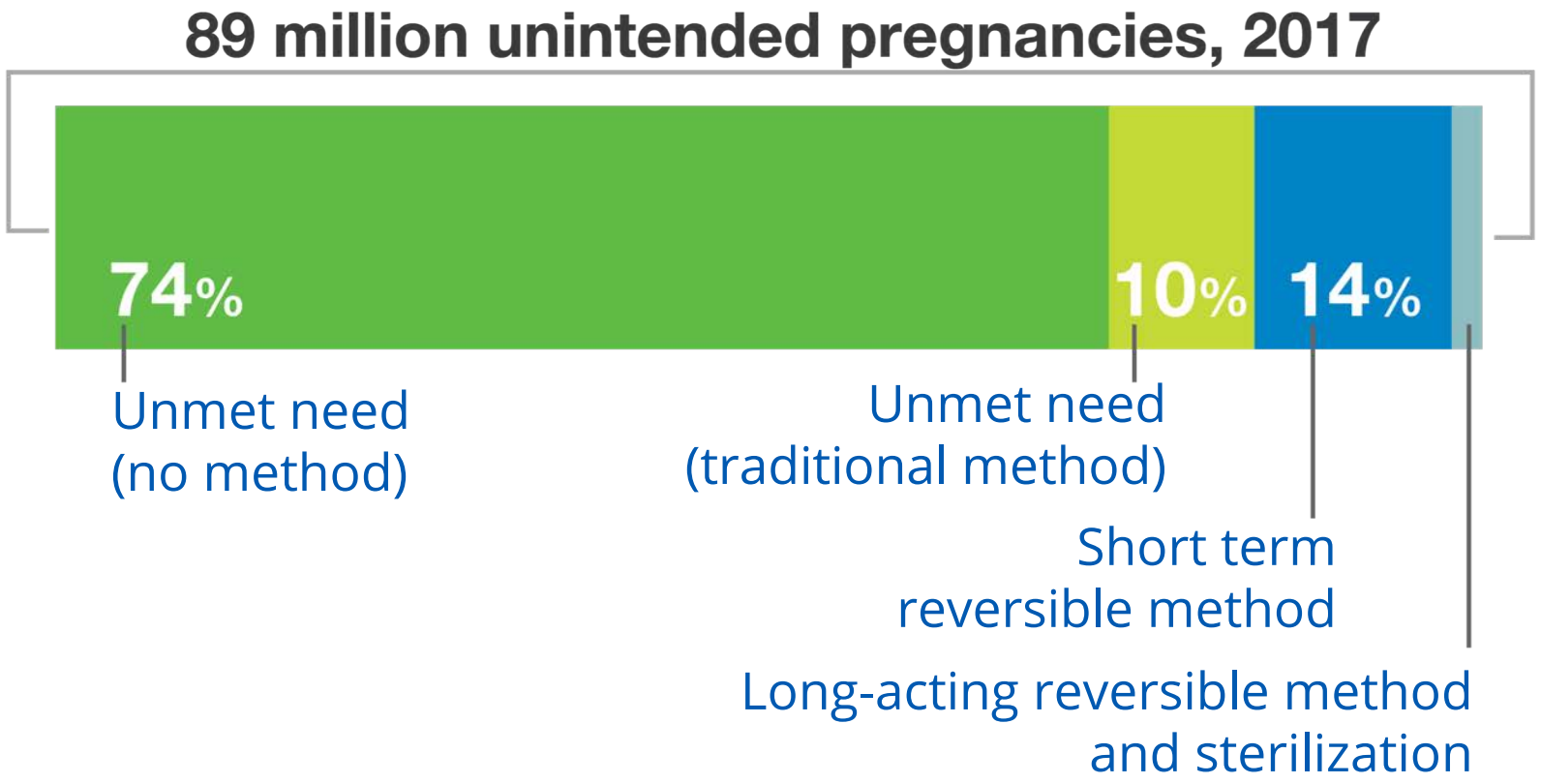
Family Planning Helps Realize the UN's Sustainable Development Goals for 2030



Source: Global Health: Science and Practice 2016

UNINTENDED PREGNANCY AND UNMET NEED

Women with unmet need for modern contraceptive methods account for 84% of unintended pregnancies.



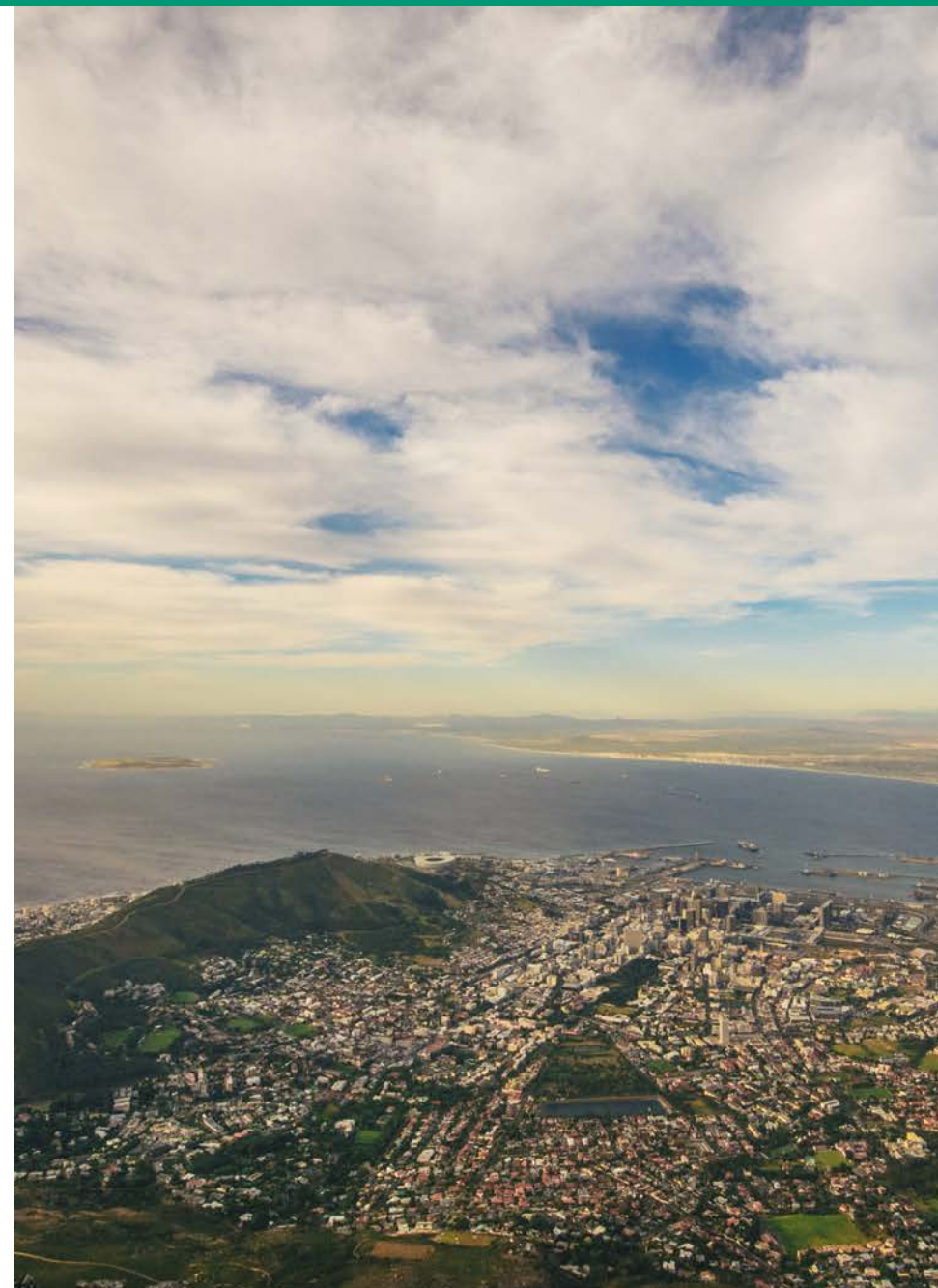
- Currently, there are 214 million women in developing regions who want to avoid pregnancy but are not using any modern form of contraception.
  - This results in 89 million unintended pregnancies each year.

Source: Guttmacher Institute 2017

Unmet Need for Family Planning

- There is currently an estimated $5.3 billion funding gap for meeting family planning needs globally.
- U.S. international aid for family planning programs represents less than 1% of the annual budget.
  - Funding for family planning programs is under threat.
  - The U.S. has denied contributions to the UNFPA since 2017 because of the Kemp-Kasten amendment.
  - The Trump Administration has also reinstated and expanded the Global Gag Rule, which limits global health programs.

Source: Kaiser Family Foundation
Photo by Scott Webb on Unsplash



Conclusions

- Fully addressing the unmet need for family planning will help solve many global issues, ranging from human rights abuses and development challenges to climate change and other environmental problems.

- Efforts to address climate change must take into consideration population dynamics and must include increasing access to reproductive health care and quality family planning services.

"Honoring the dignity of women and children through family planning is not about centralized governments forcing the birth rate down—or up, through natalist policies. Nor is it about agencies or activists in rich countries, where emissions are highest, telling people elsewhere to stop having children. It is most essentially about freedom and opportunity for women and the recognition of basic human rights."

-Paul Hawken, Drawdown (2017)

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