



SESSION 14. PART 1.

INTRODUCTION TO CLIMATE CHANGE CONCEPTS AND CRM

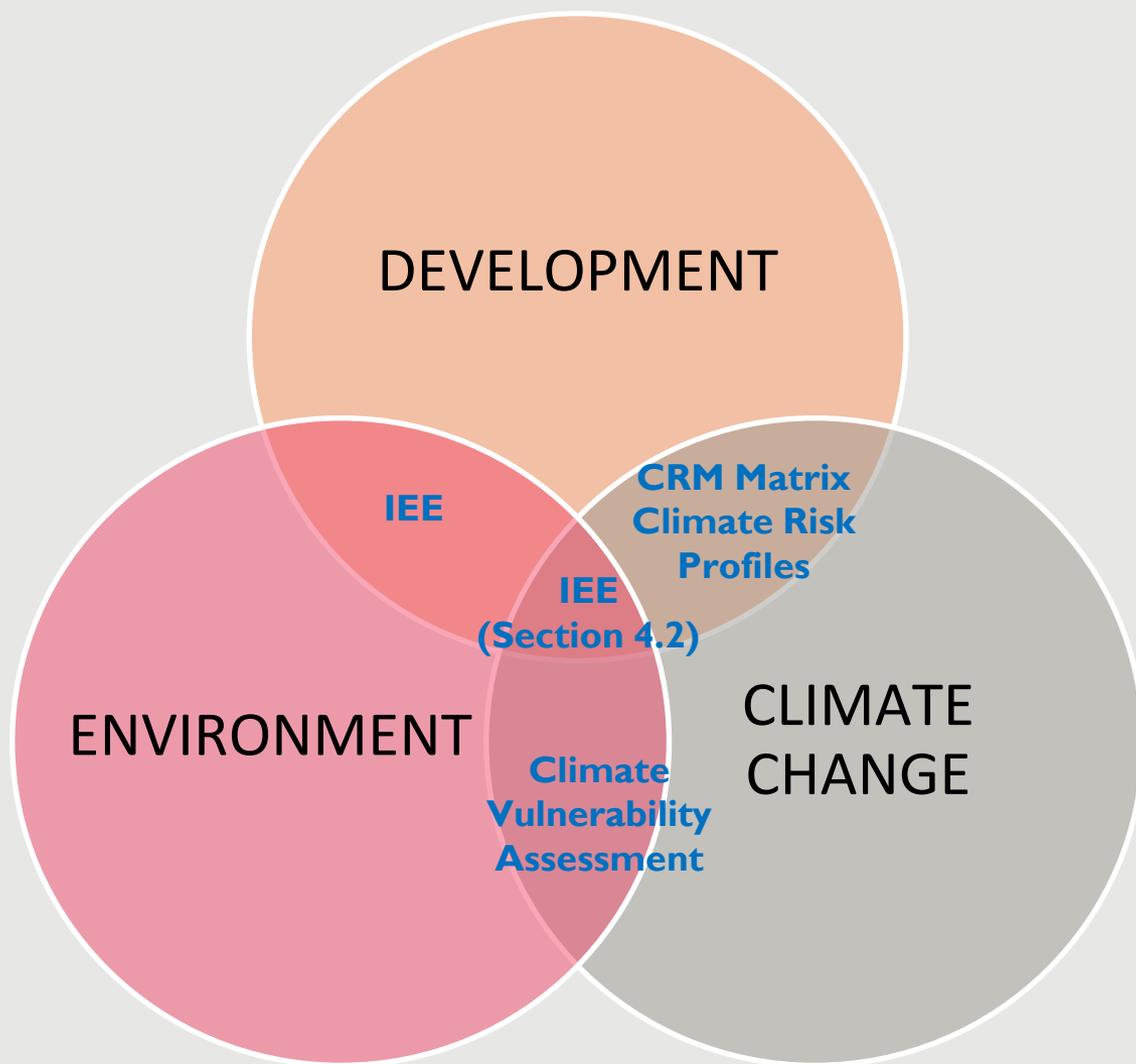
Dakar, Senegal • June 2018



GLOBAL ENVIRONMENTAL
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WHY ARE WE DISCUSSING CLIMATE AT AN ENVIRONMENT WORKSHOP?



CRM Module Logic

1. Consider USAID policy
2. Gain an understand of basic concepts
3. Understand the climate change and development nexus
4. Day 3 site visit and classroom work – environment and development interaction for IEEs
5. Day 4 site visit and classroom work– development and climate change interaction for CRM screening; non-climate stressors (including environment)

SESSION LEARNING OBJECTIVES

- Review USAID policy on climate change
- Discuss key climate concepts and terminology
- Briefly review climate projects in Senegal and Mali
- Examine how climate change relates to development work in different sectors

USAID MANDATE:

JOINT STRATEGIC PLAN 2018 - 2022

- “We will promote the use of U.S. pollution control technologies, combat environmental crimes and marine debris, and support **innovative approaches to climate resilience.**”
- “We will **foster the ability of countries and communities to take on the responsibility for building resilience and managing risks from shocks and stresses** by helping countries more effectively harness their domestic resources as well as private sector capital.”
- “Global economic security and development also face **risks from the disruption caused by natural disasters.** Economic losses from hazards such as storms, earthquakes, and pandemics are both drivers and symptoms of state fragility.”

USAID MANDATE:

CRM POLICY EXPECTED TO CATALYZE CHANGE AT THE IMPLEMENTATION LEVEL

Mandatory Reference on Change in USAID Strategies (October 2015) – ADS201mat

- All new CDCS are screened for climate change risks and appropriately adjusted.
- PAD/project designs are selected on a volunteer basis to be screened for climate change risks and appropriately adjusted.

Mandatory Reference on Climate Risk Management for USAID Projects & Activities (October 2016) – ADS201mal

- All new CDCS and other strategies are screened for climate change risks and appropriately adjusted.
- All new project designs and activities must be screened for climate change risks and appropriately adjusted.

DEVELOPMENT BEST PRACTICES: DESIGNING FOR CLIMATE CHANGE

ENVIRONMENTAL APPLICATIONS

Climate change impacts projects

Climate change will affect future baseline conditions



Projects impact climate change

While individual projects are rarely significant contributors to global climate change, climate change is driven by the sum of many small actions



Projects must be designed to be **ROBUST** to these conditions



Even small-scale projects should seek to reduce greenhouse gas emissions/increase sequestration and reduce climate vulnerability in the local area in a manner consistent with their development objectives

DEFINING KEY TERMS

Climate

Average weather conditions over time:

What we expect

Weather

Conditions in the short-term:

What we get

Climate change

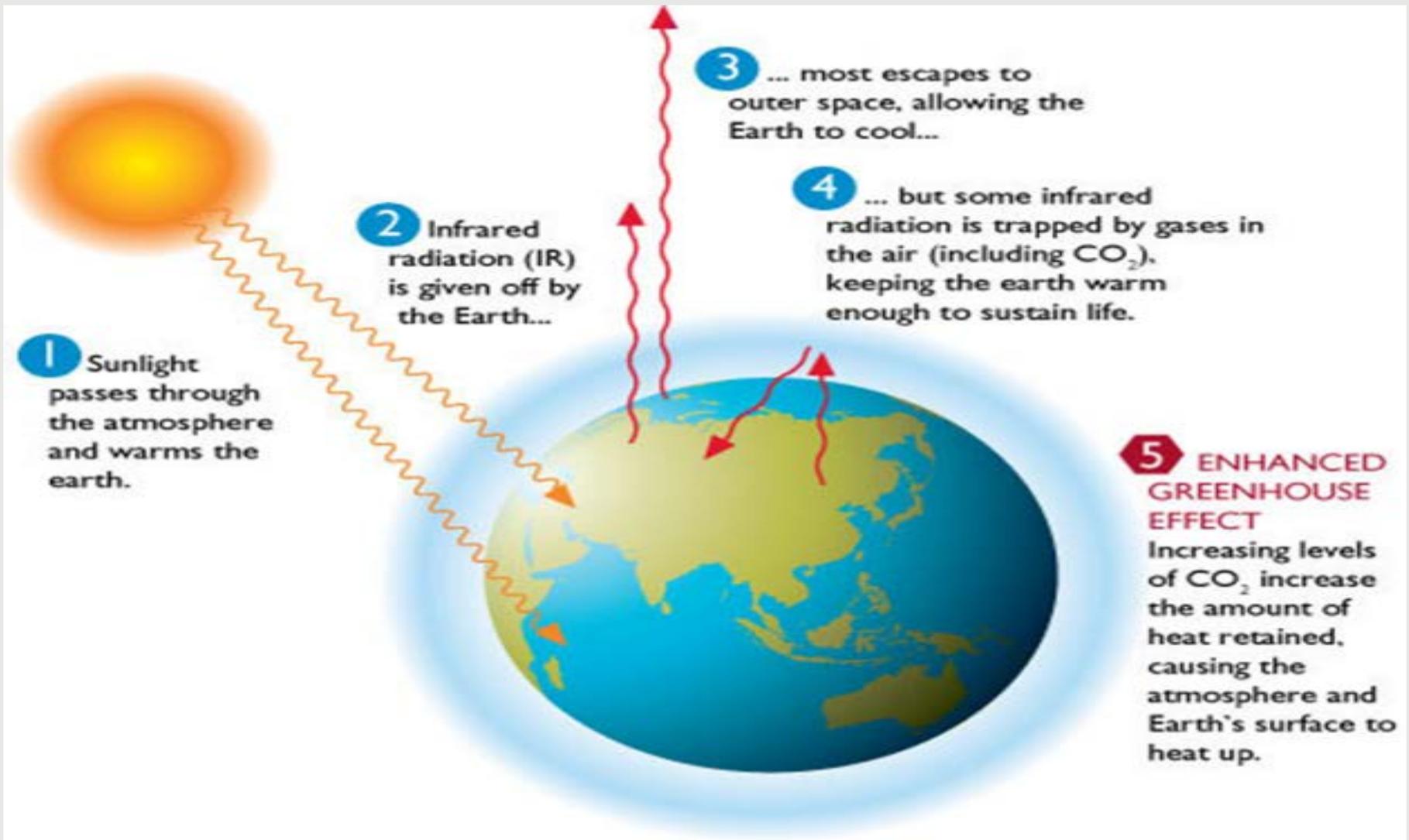
Directional trends in average weather conditions over decades or longer

Climate variability

Short-term fluctuations around the average

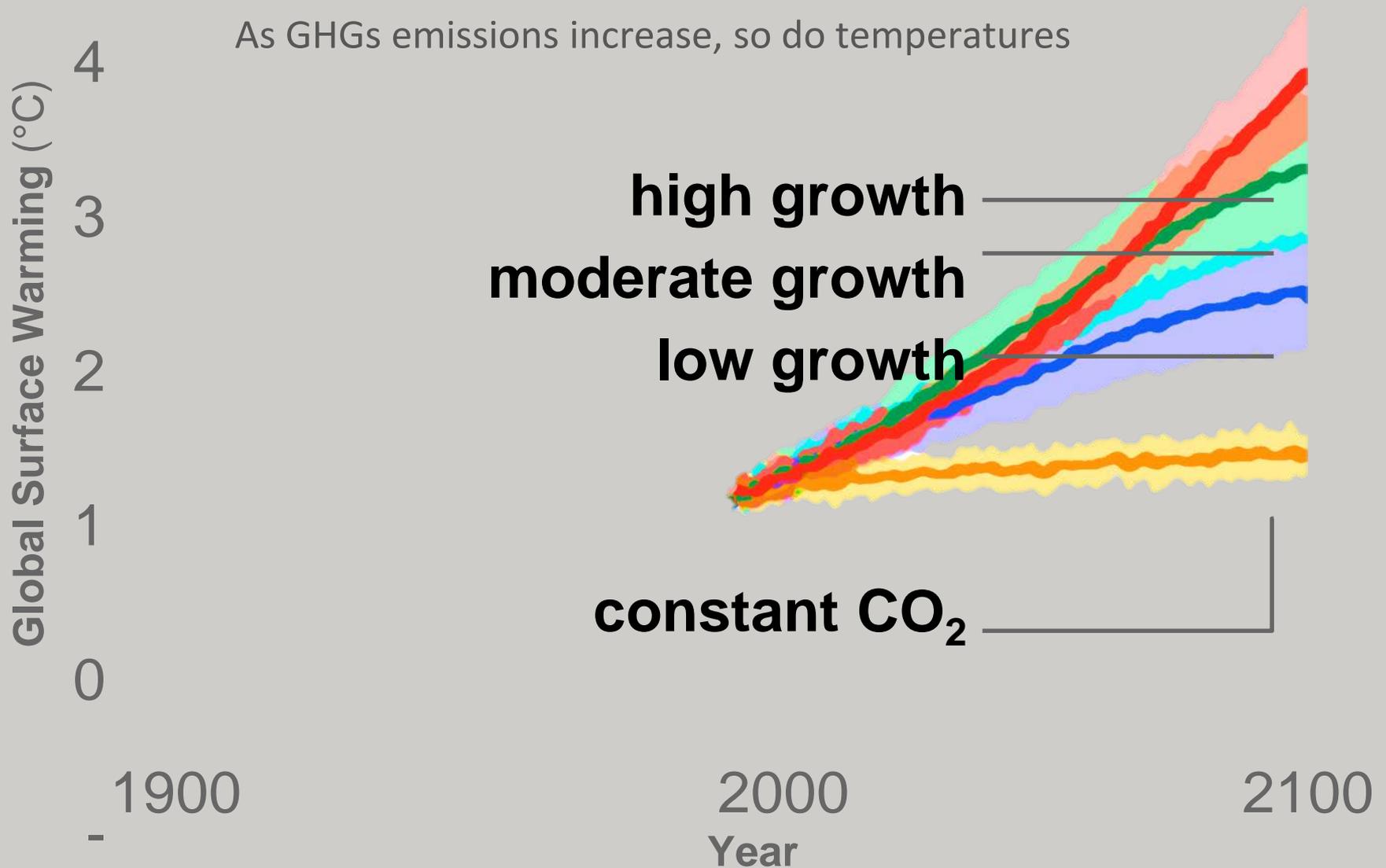


CAUSES OF CLIMATE CHANGE

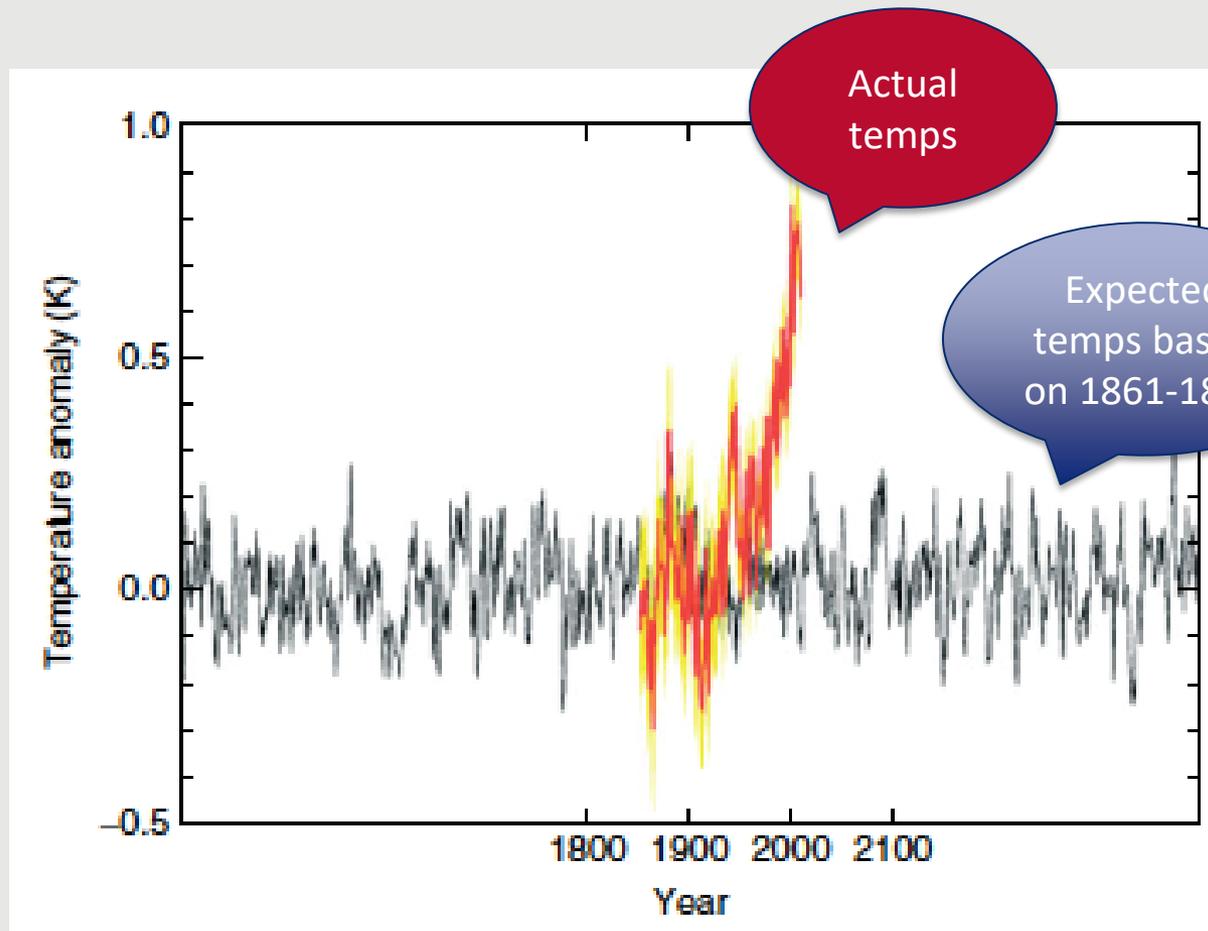


CO_2 in the atmosphere acts like a blanket that warms the Earth

GHG EMISSIONS AND PROJECTED CLIMATE CHANGE

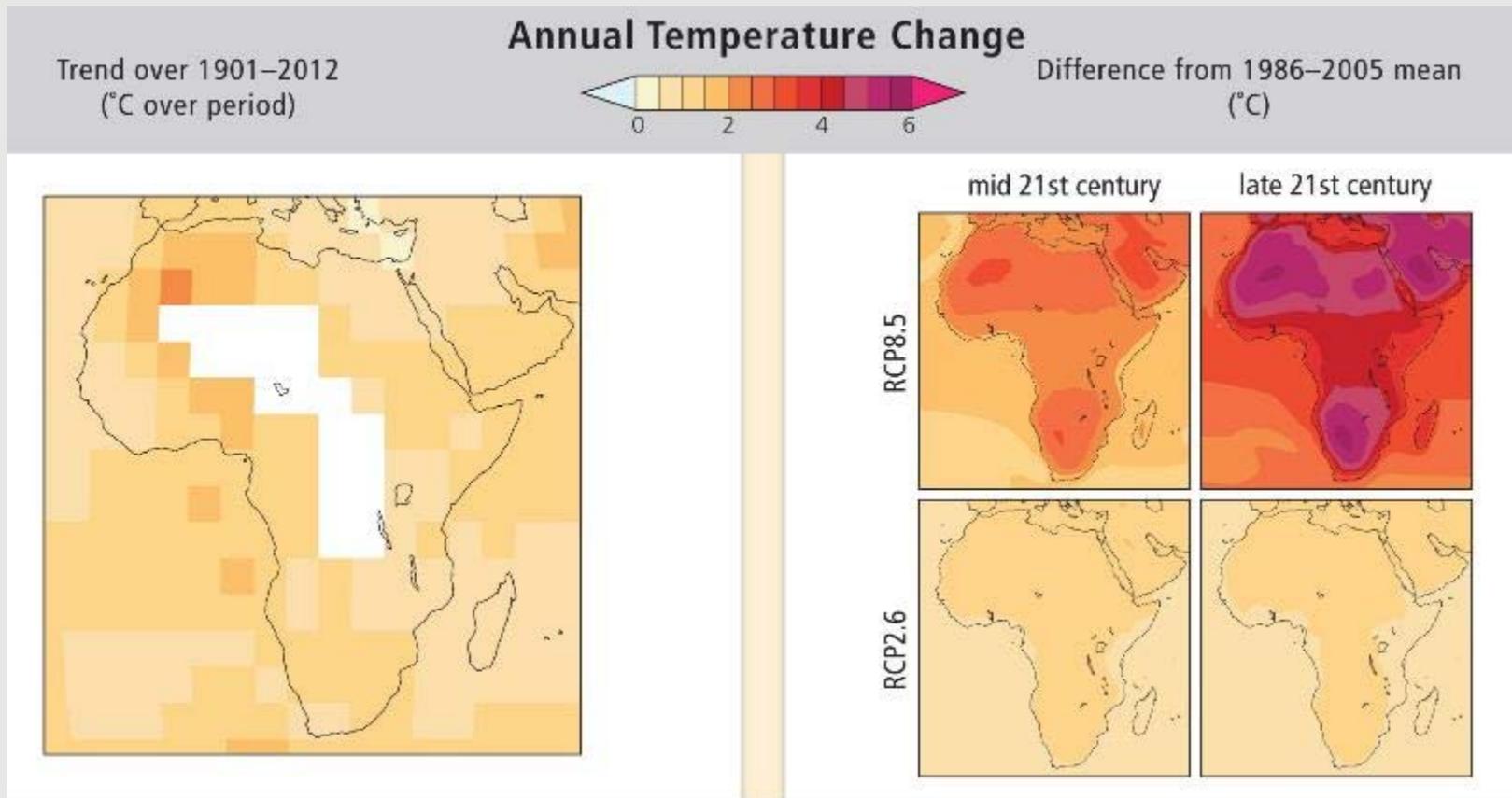


AVERAGE GLOBAL AIR TEMPERATURES ARE HIGHER NOW THAN THEY HAVE EVER BEEN IN THE LAST 1,000 YEARS



Source: Stott et al. (2010)

AIR TEMPERATURES ACROSS AFRICA HAVE ALREADY INCREASED AND WILL CONTINUE TO INCREASE IN THE 21ST CENTURY

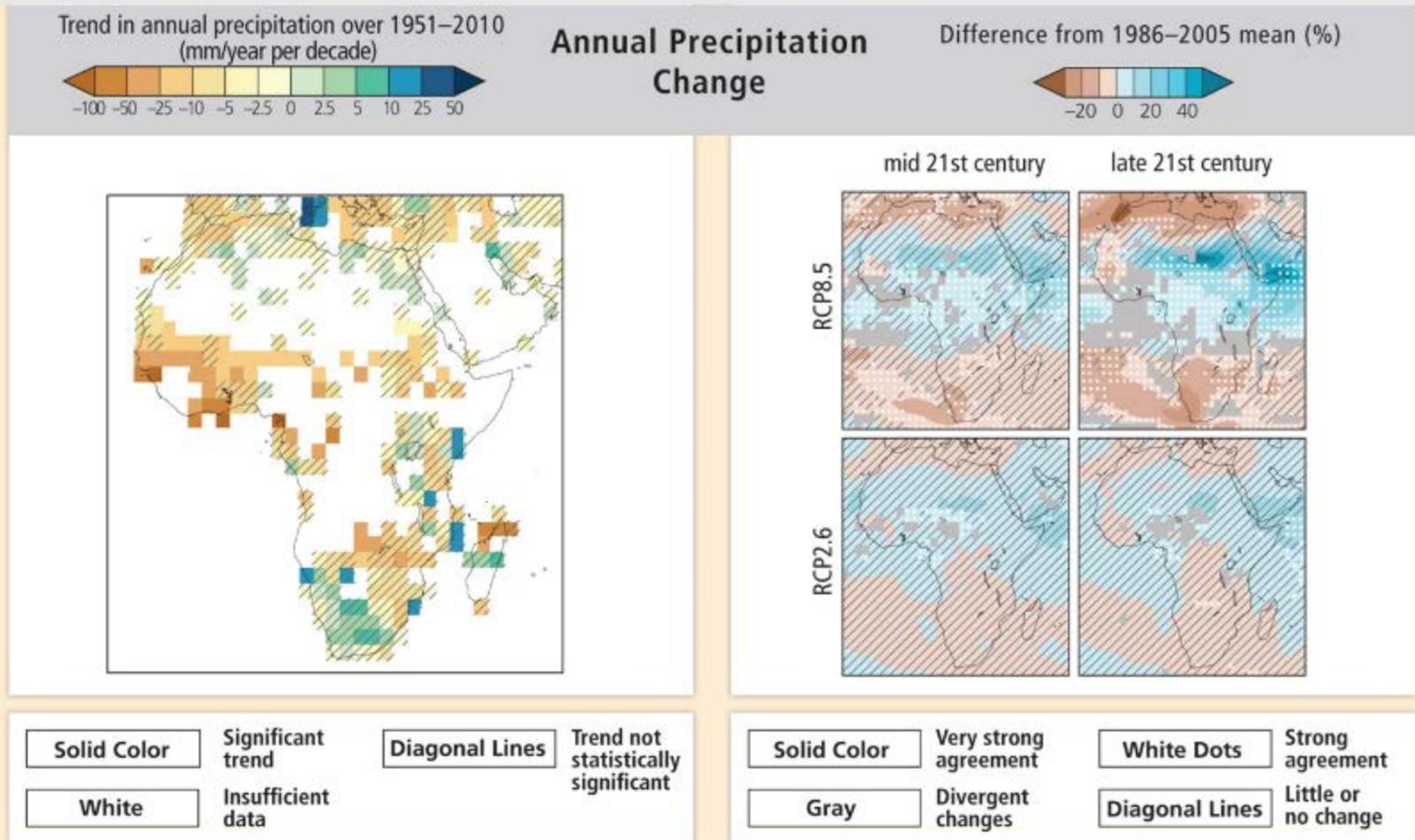


HIGH CONFIDENCE IN TEMPERATURE PREDICTIONS: WE KNOW ENOUGH TO ACT

Sahel projections by 2100:

- Rising average annual temperatures by 3–6°C (3°C in coastal areas and +4°C in continental areas)
- Maximum warming in summer and increase in minimum temperatures.
- Decreases in the frequency of ‘cold’ days and nights, with no “cold” nights after 2090.

ACROSS MUCH OF AFRICA, RAINFALL PATTERNS ARE CHANGING AND ARE EXPECTED TO CONTINUE CHANGING



MIXED CONFIDENCE IN RAINFALL PREDICTIONS: WE MAY NEED MORE CREATIVE RESPONSES

Sahel projections by 2100:

- Uncertainties exist about whether rainfall will increase or decrease, but high inter-annual variation and distribution of rainfall is expected.
- Reduction in the duration of the rainy season with increased extreme rainfall events in the southern Sahel.
- Rising sea level of up to 14.4 cm by 2050 and 40 cm by 2100.

UNDERSTANDING IMPACTS: CLIMATE IMPACTS CUT ACROSS SECTORS



DEFINING KEY TERMS

Term	Definition	Example
Climate stressor	A condition, event, or trend related to climate variability and change.	Increasing frequency and intensity of drought conditions can be a <i>climate stressor</i> for crops. Rising sea level is another climate stressor.
Impacts	Effects on natural and human systems that result from hazards.	For example, rising temperatures and greater rainfall variability may affect agricultural productivity, with implications for food security.
Non-climate stressor	Non-climate stressors are development challenges that can harm the functioning of a system, thus hindering the achievement of development goals.	Environmental degradation, corruption, and pollution are non-climate stressors. Population growth along exposed coasts is another non-climate stressor.
Risks	Climate risks are potentially severe adverse consequences for development programs (or for humans and social-ecological systems) resulting from the interaction of climate-related hazards with the vulnerability of societies and systems exposed to climate change.	They should be articulated in terms of the impact on the program due to the expected climate stressor, e.g., reduced crop productivity due to higher temperatures.

SENEGAL CLIMATE RISK PROFILE

CLIMATE PROJECTIONS



1–3°C increase in temperatures by 2060



1m rise in sea levels by 2100



Increased unpredictability of seasonal rains and increased intensity of rainfall events

Agriculture



Reduced crop quality and yields
Decreased livestock productivity
Increased incidence of locust invasions

Water



Reduced availability and degraded quality of freshwater resources
Reduced hydropower production

Coastal Zones



Flooding of urbanized areas
Damage to coastal infrastructure
Salinization of aquifers and arable land

Fisheries



Shift in distribution of species
Habitat destruction and degradation
Loss of income and livelihoods

Health



Increased risk of water- and vector-borne diseases
More heat-related health issues

MALI CLIMATE RISK PROFILE

CLIMATE PROJECTIONS



1.2-3.6°C increase in temperatures by 2060



Increased evapotranspiration-drying of soils and land



Decrease in average annual rainfall by 8.7 percent.
Increased unpredictability.

Agriculture



Loss of agricultural productivity and agricultural jobs
Increased food insecurity

Water



Destruction of infrastructure
Drinking water shortages.

Livestock



Increased grazing competition
Decreased livestock income

Health



Increased rates of respiratory disease.
Increased vector borne diseases.

KEY TAKEAWAYS

- Rising CO₂ levels are causing significant climate changes: higher temperatures, changing amounts and timing of rainfall, changes in drought and flood cycles, extreme events, and sea level rise.
- We need to deliberately understand the level of confidence in predictions, so that we can better plan around the key risks.
- The physical impacts of climate change translate into significant development impacts which cut across multiple sectors and affect USAID's ability to achieve its development objectives.



SESSION 14. PART 2.

CLIMATE CHANGE AND DEVELOPMENT

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CLIMATE CHANGE TOUCHES ALL ASPECTS OF THE DEVELOPMENT CONTEXT, for example...



WATER



AGRICULTURE



**INFRA-
STRUCTURE**

GOVERNANCE



HEALTH



BIODIVERSITY



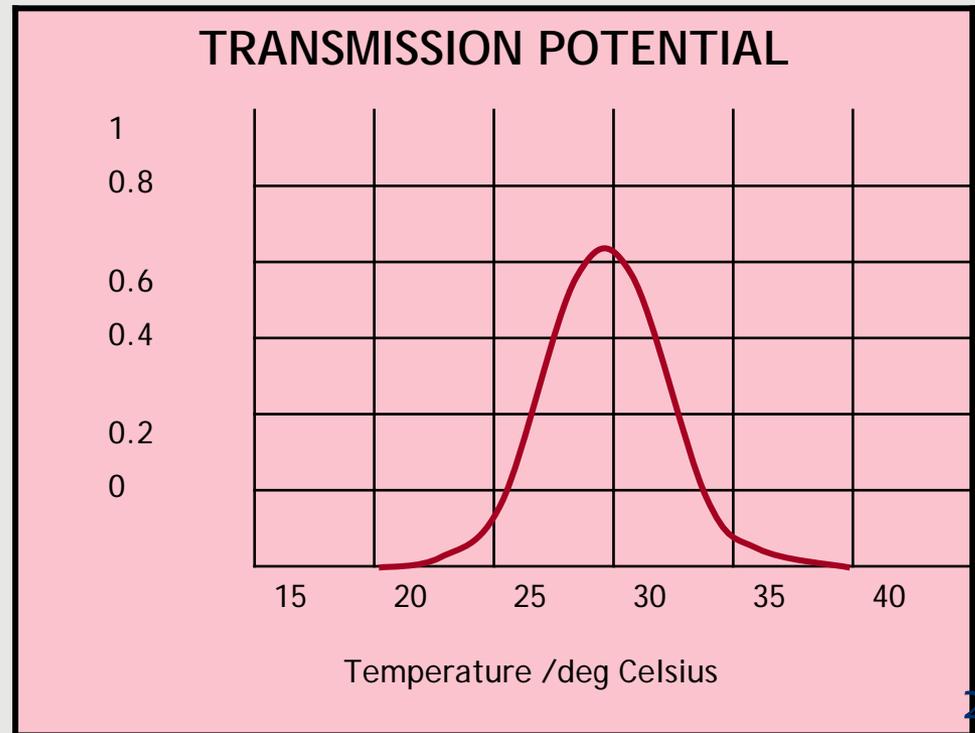
MIGRATION

HEALTH

PRIORITY AREA: MALARIA

With higher temps,

- More bites per day
- Fewer days of incubation of the parasite
- Little change of mosquito survival until the temperature is $> \sim 37^{\circ}\text{C}$

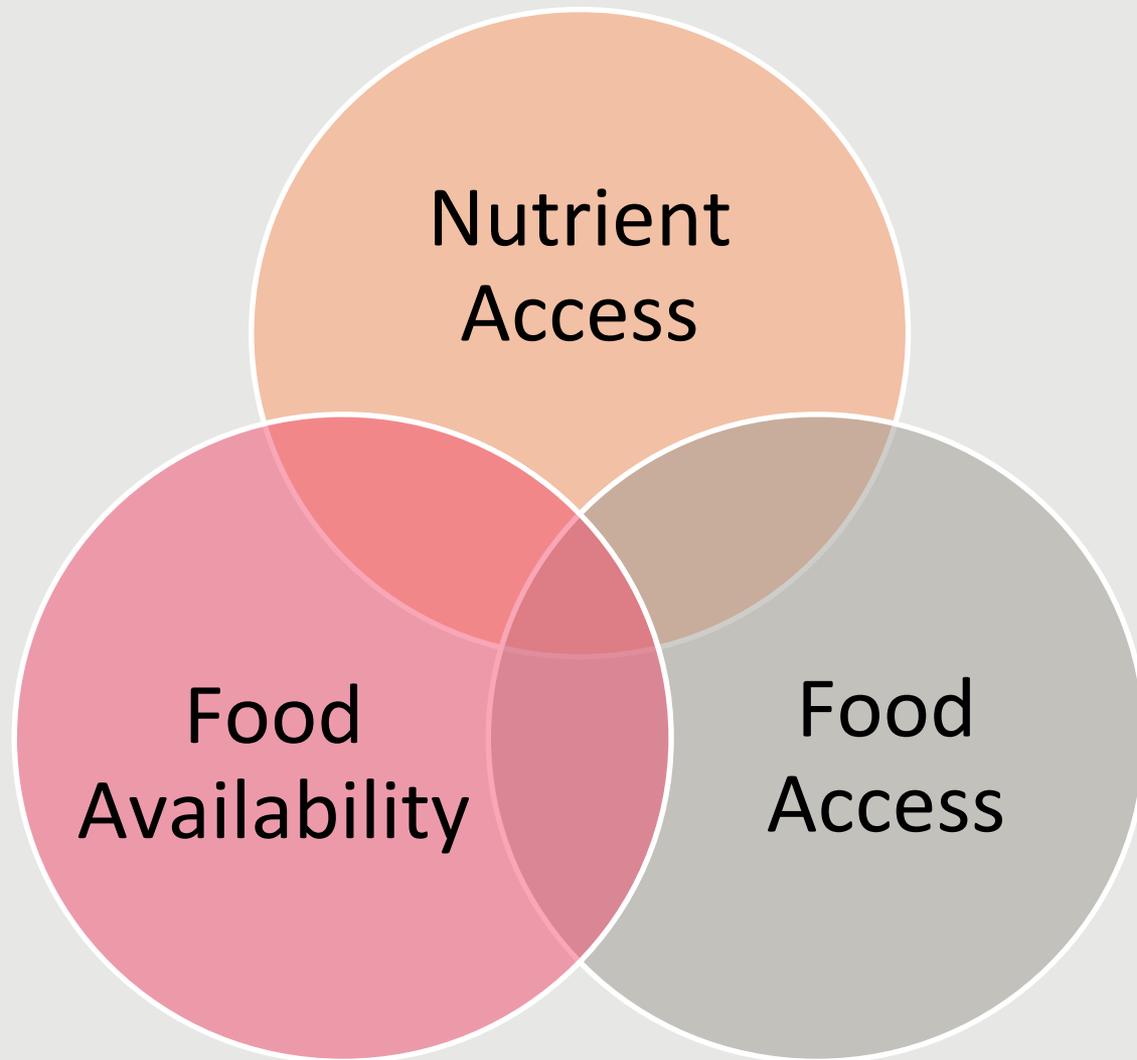


PRIORITY AREA: CHOLERA

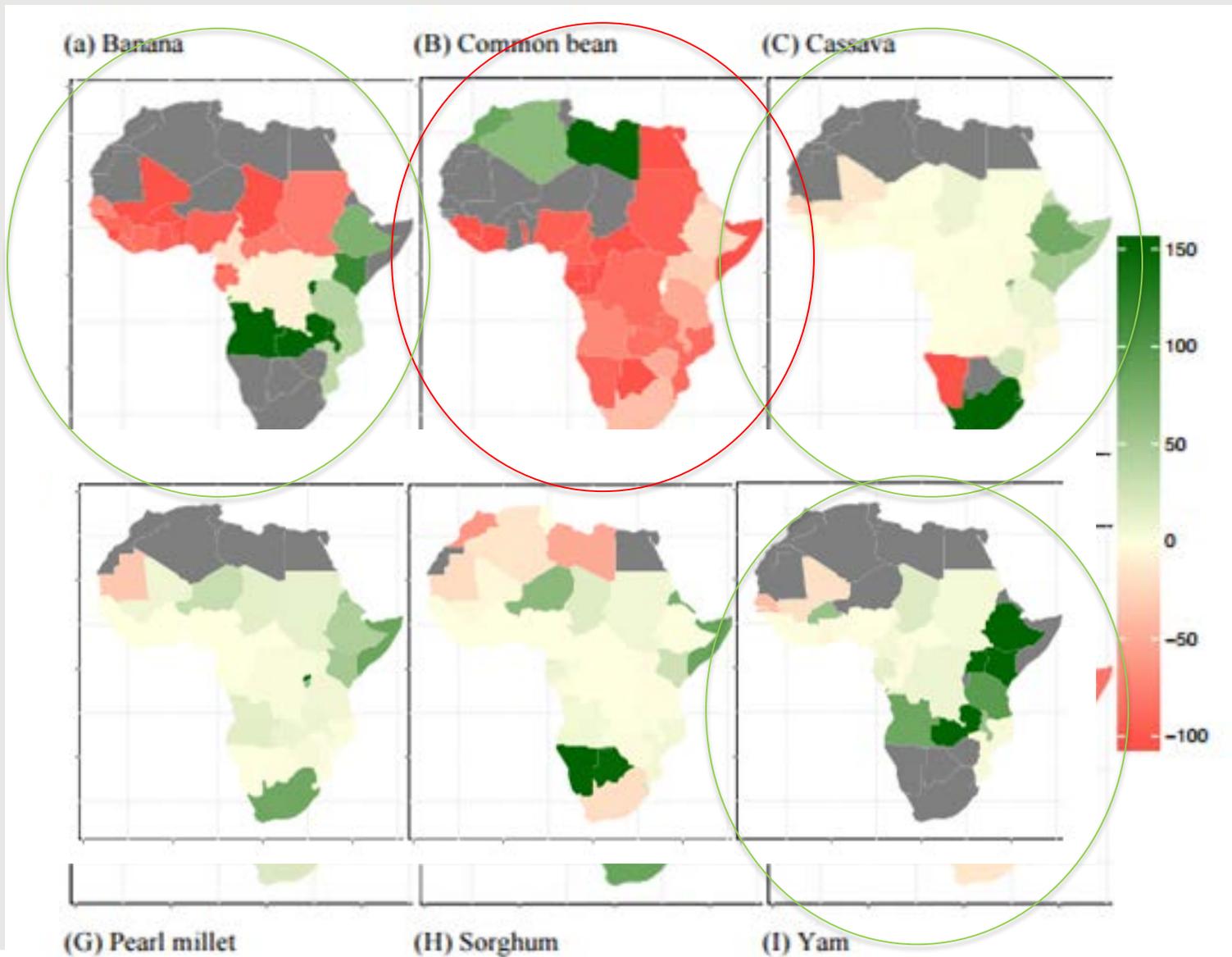
- Cholera outbreaks are associated with increased temperatures and changes in rainfall and with extreme events such as drought.
- Projected increases in precipitation will possibly lead to more frequent cholera outbreaks in places where cholera is endemic.

ANTICIPATED CHOLERA IMPACT	
	With 1°C temperature increase, initial relative risk of cholera increases by 15 to 29 percent
	Total costs of cholera attributable to climate change: estimated at 0.32 to 1.4 percent of GDP in 2030

FOOD SECURITY
RISKS TO...



PROJECTED CHANGE IN SUITABLE AREA FOR KEY CROPS BY THE 2050s



FOOD SECURITY

EFFECTS ON PRODUCTIVITY AND NUTRITION

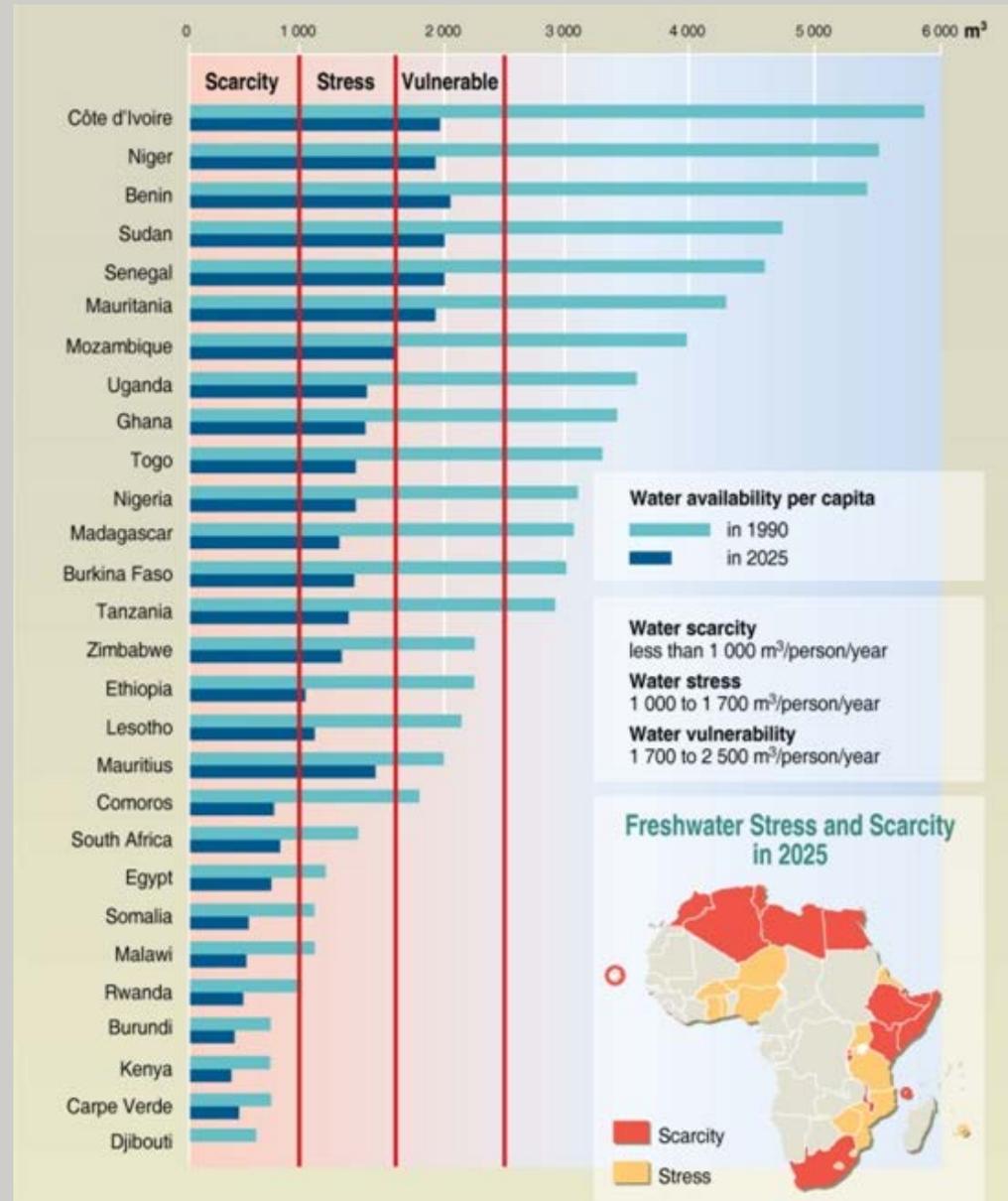
- Productivity may decline as:
 - Grains reach their thermal tolerance
 - Vectors/pests destroy crops during growth and storage
 - Changing rainfall patterns increase cycles of floods and droughts
- Emerging impacts of climate change responses on nutritional content
 - Short-maturing, drought resistant crops MAY have lower concentrations of protein and micronutrients
 - Plants grown in high CO₂ conditions have less zinc, iron and protein, potentially resulting in micronutrient deficiencies



NATURAL RESOURCE MANAGEMENT

WATER AVAILABILITY

- Decreased water availability
- By 2025, approximately 3 billion people will be living below the water stress threshold



KEY TAKE-AWAYS

- Climate impacts are already happening and pose a threat to the sustainability of current and planned investments
- Risks are well documented for many investments and sectors (water, agriculture, health..)
- Investments may increase or decrease vulnerability of natural and human systems to climate change
- Climate change can undo decades of development and poverty-reduction efforts, locking up substantial future development expenditure into disaster recovery instead