MITIGATION & ADAPTATION TO CLIMATE CHANGE

1. INTRODUCTION TO CLIMATE CHANGE

BCI Better Cotton Initiative
www.bettercotton.org

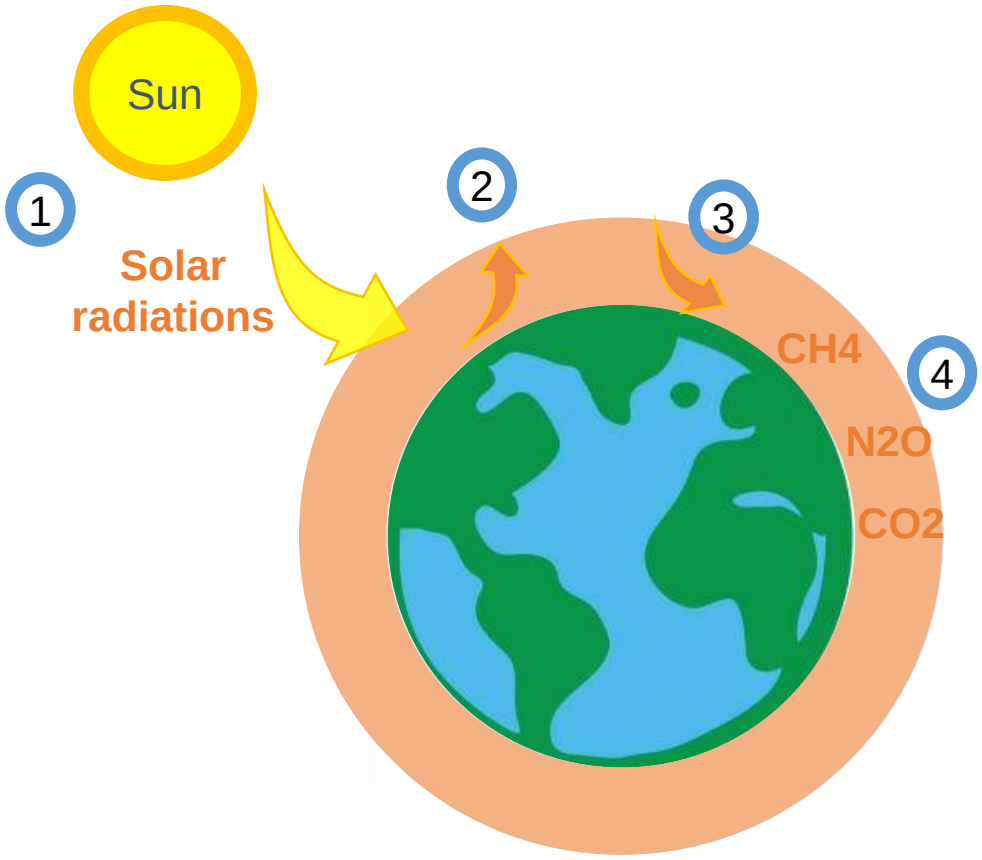
TRAINING OVERVIEW

- You are in the 1st step of your training
- **Learning outcomes**
  - What is Climate Change?
  - Which are the interlinks between Climate Change & Cotton production?
  - What are Adaptation & Mitigation measures?
  - What is BCI's approach to Climate Change?

Chapters	Time
1. Introduction on Climate Change	20mins
2. Climate Change in Agriculture	10mins
3. BCI & Climate Change	10mins
Assessment	10mins
Total time: 50mins	

1. INTRODUCTION TO CLIMATE CHANGE

THE GREENHOUSE GAS EFFECT

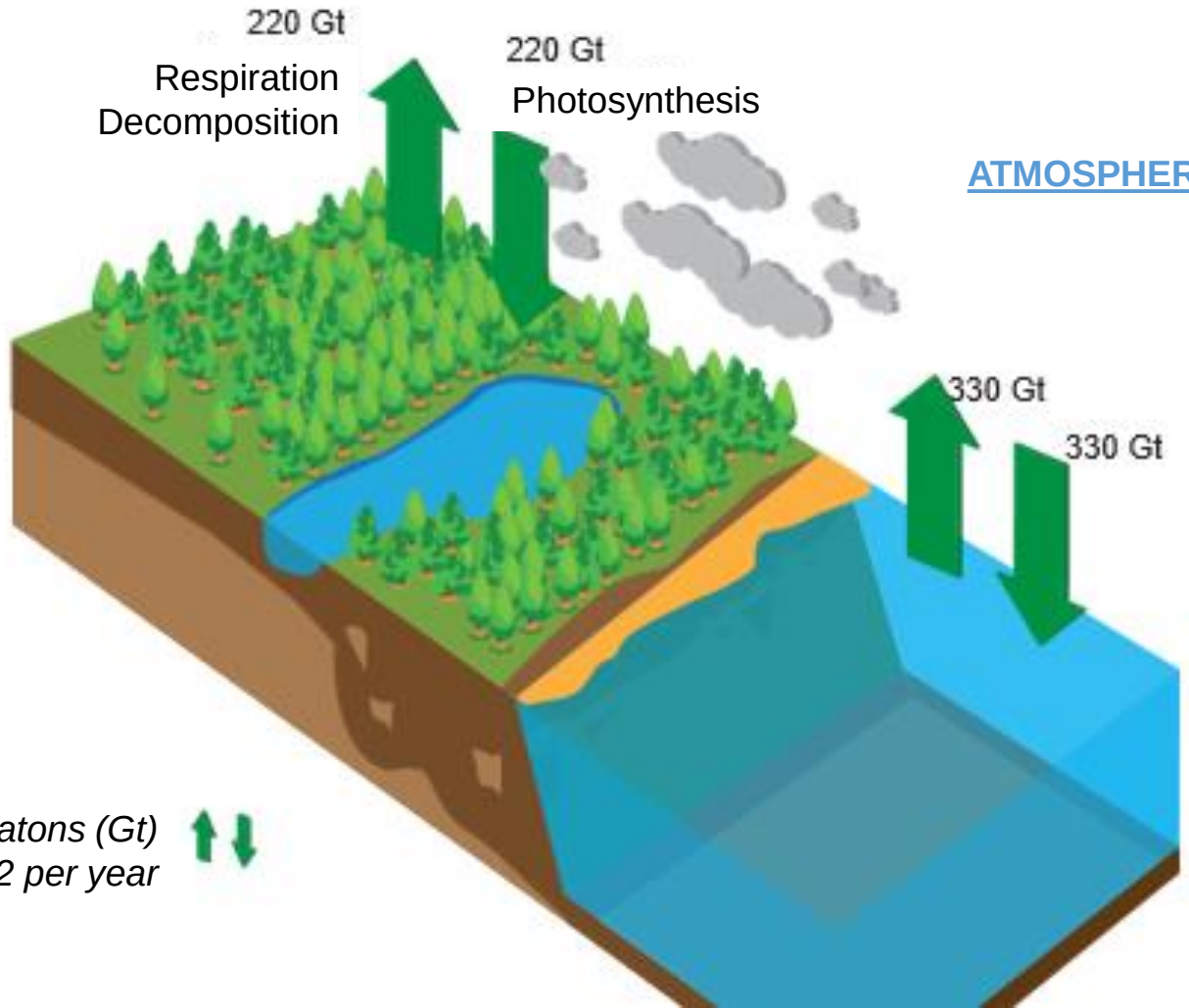


1. The sun warms the earth via solar radiations
2. Some solar radiations are reflected by the Earth and the atmosphere
3. But most solar radiations are absorbed by the Earth's surface and warm it
4. The Earth's infrared radiation is absorbed and re-emitted in all directions by the greenhouse gas molecules because of the warm atmosphere
5. This greenhouse gas effect warms the Earth's surface and the atmosphere

- **If the quantity of greenhouse gas in the atmosphere increases, the temperature of the Earth surface and atmosphere increases too…**

THE «NATURAL» CLIMAT SYSTEM

Natural exchanges : the emissions and absorptions are balanced



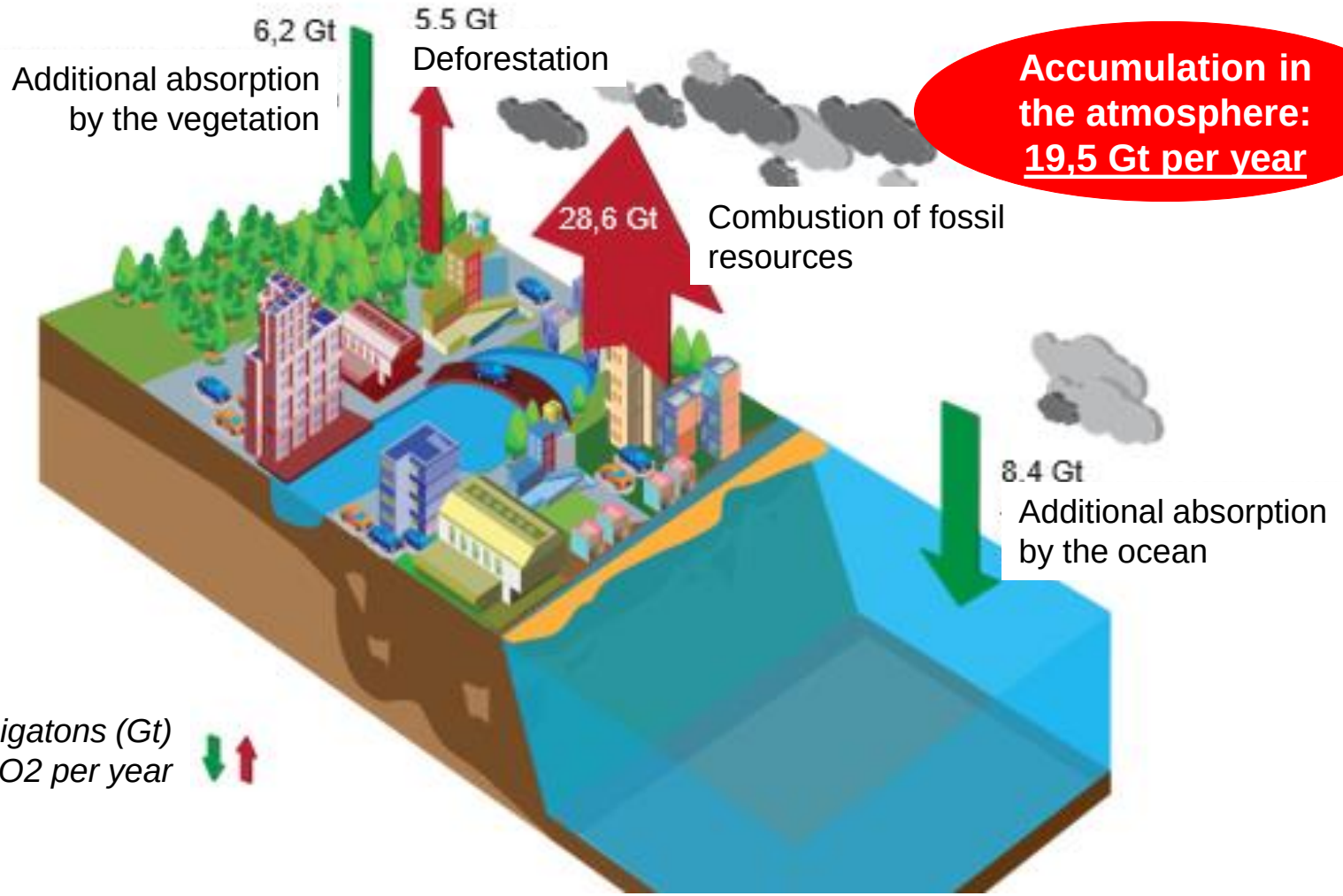
BIOSPHERE
Organic mater, fossil energy, calcareous sediments

OCEAN
Marine life, dissolved organic carbon, deep ocean

Flux in Gigatons (Gt) of CO2 per year

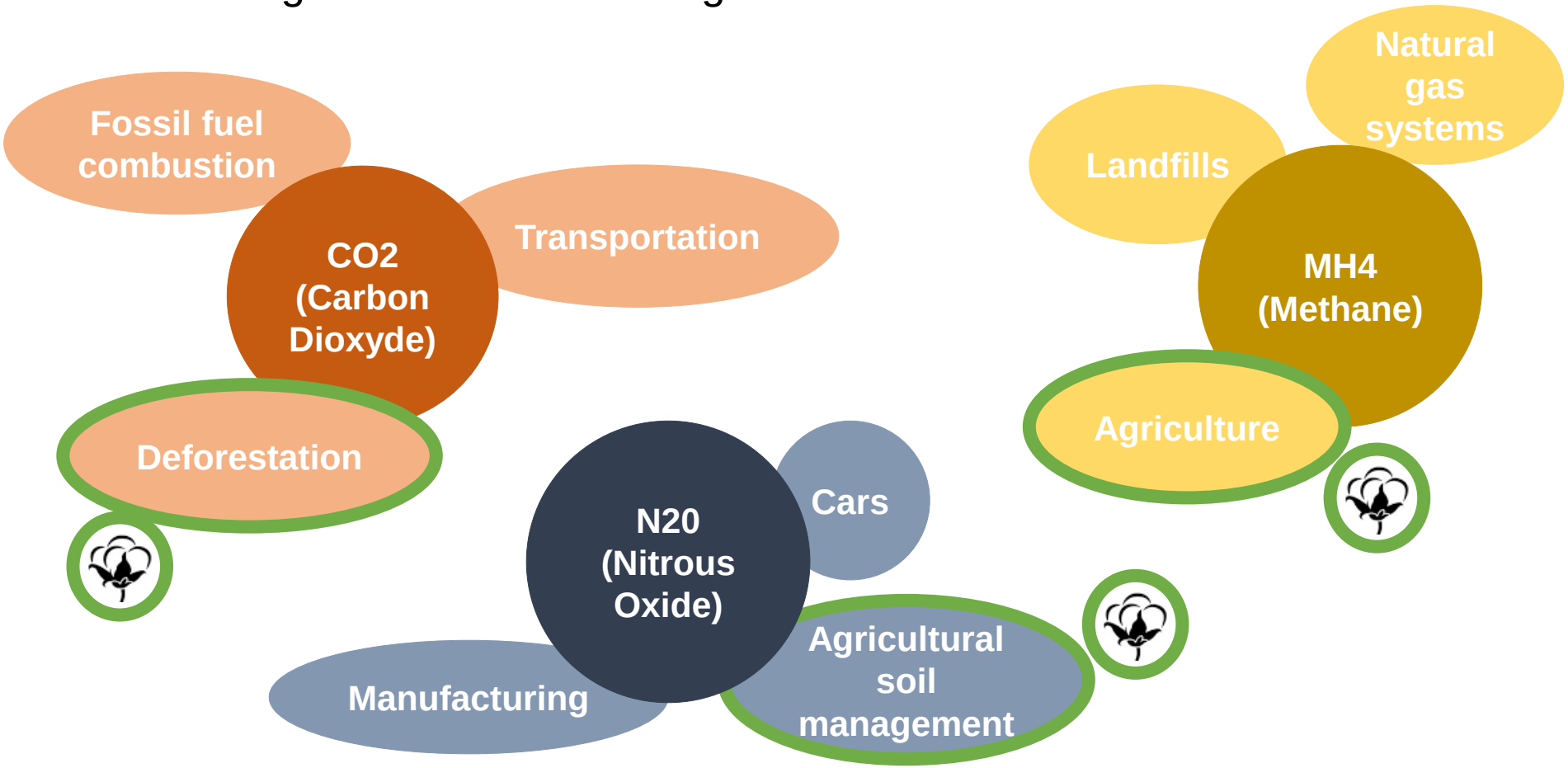
THE «HUMANISED» CLIMAT SYSTEM

Accumulation of carbon in the atmosphere due to human activities

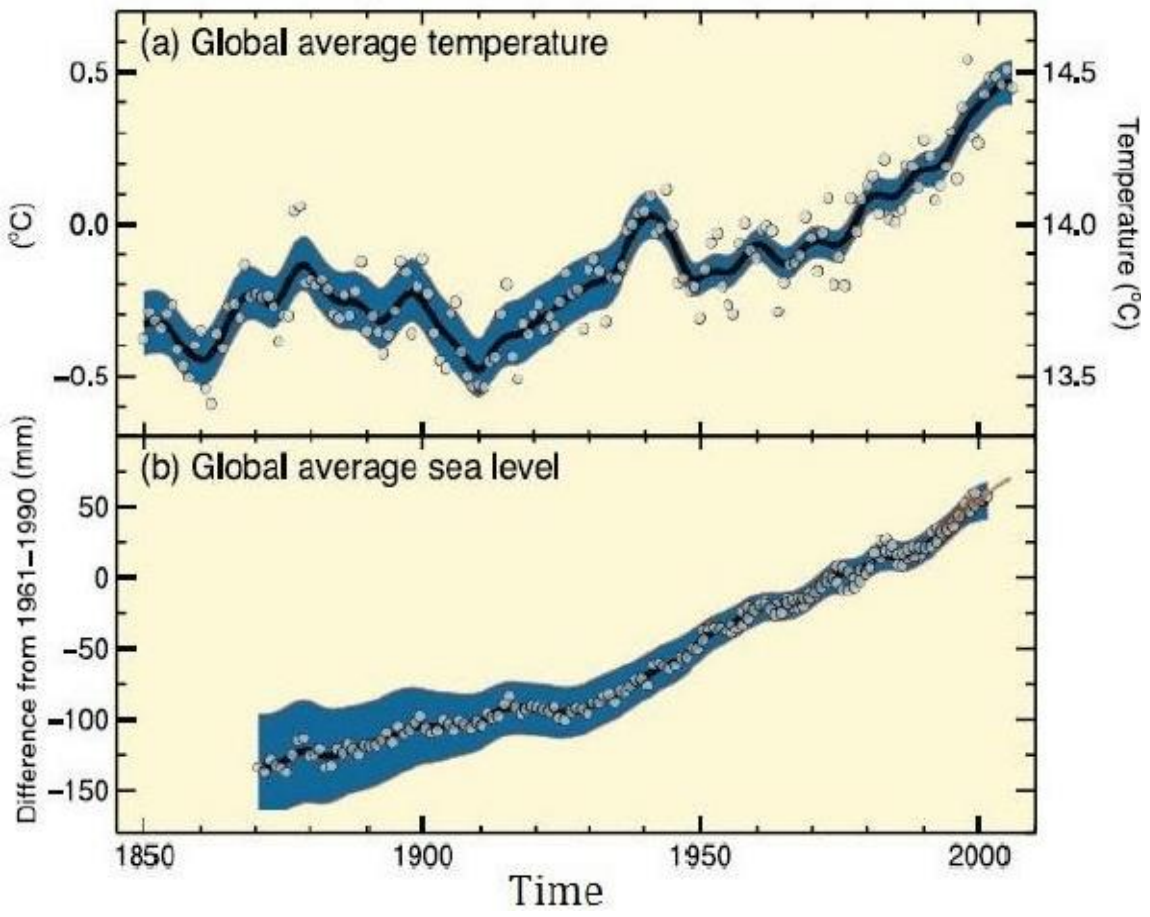


GLOBAL GREENHOUSE GAS EMISSIONS…

- There are 3 main Greenhouse Gases (GHG): CO2, MH4 and N2O
- CO2 is the main greenhouse gas (57% of all GHG)
- Agriculture is the 4th largest contributor to GHG emissions

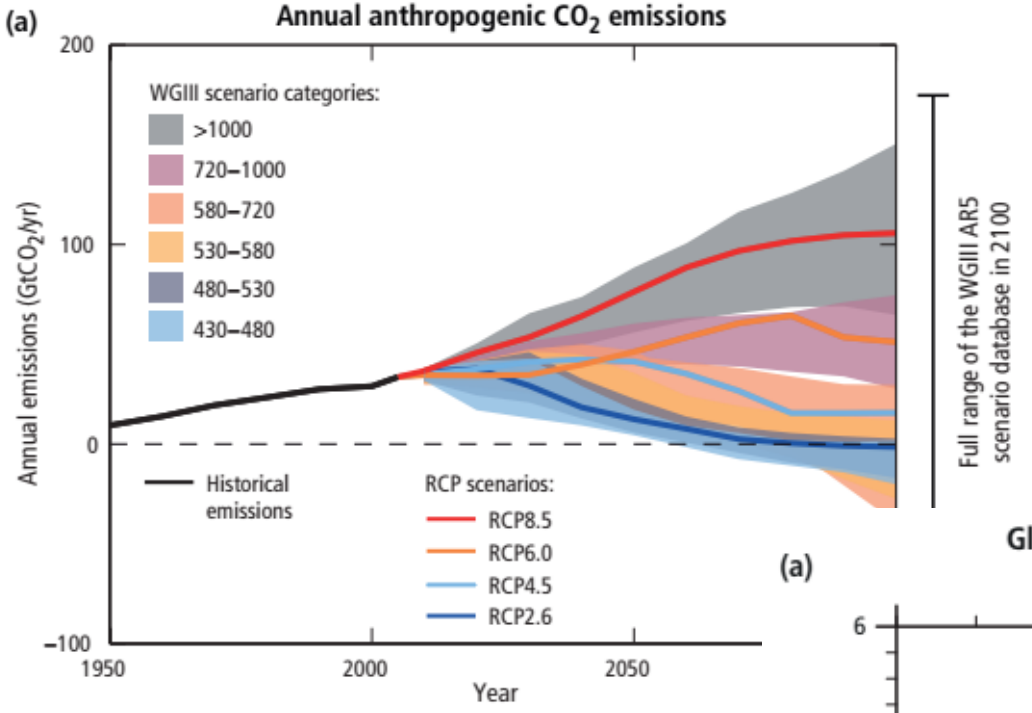


THE TEMPERATURE IS RISING…



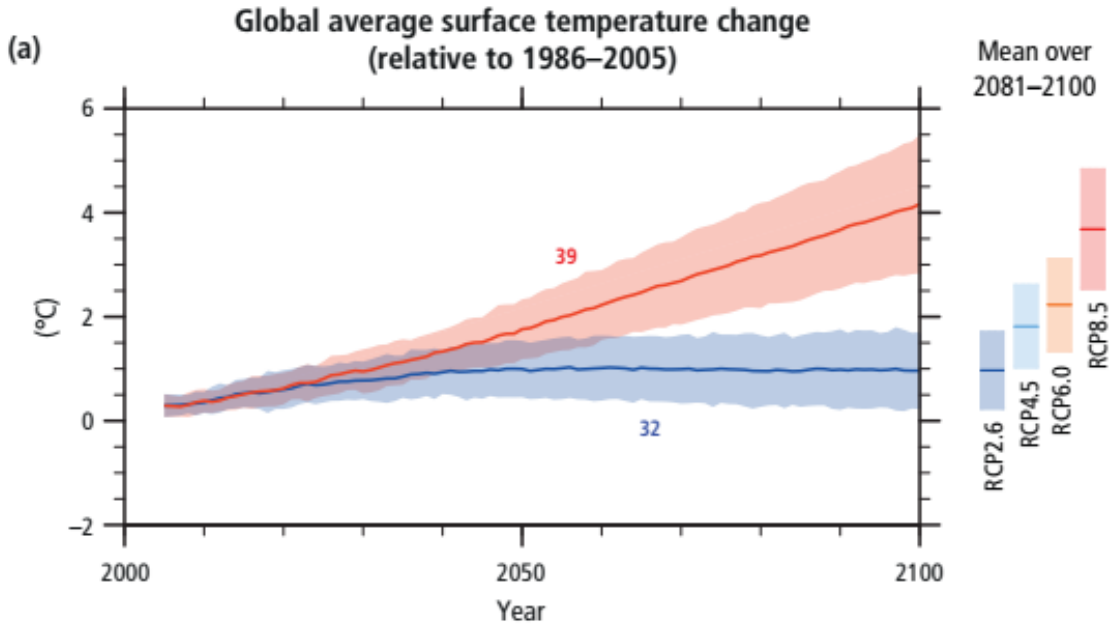
- +1°C between 1901 and 2012
- The last 30 years have been the warmest since 1850
- The global sea level raised by +20 cm since 1900
- Glaciers' melting is accelerating since 1950

CLIMATE CHANGE IN THE FUTURE…

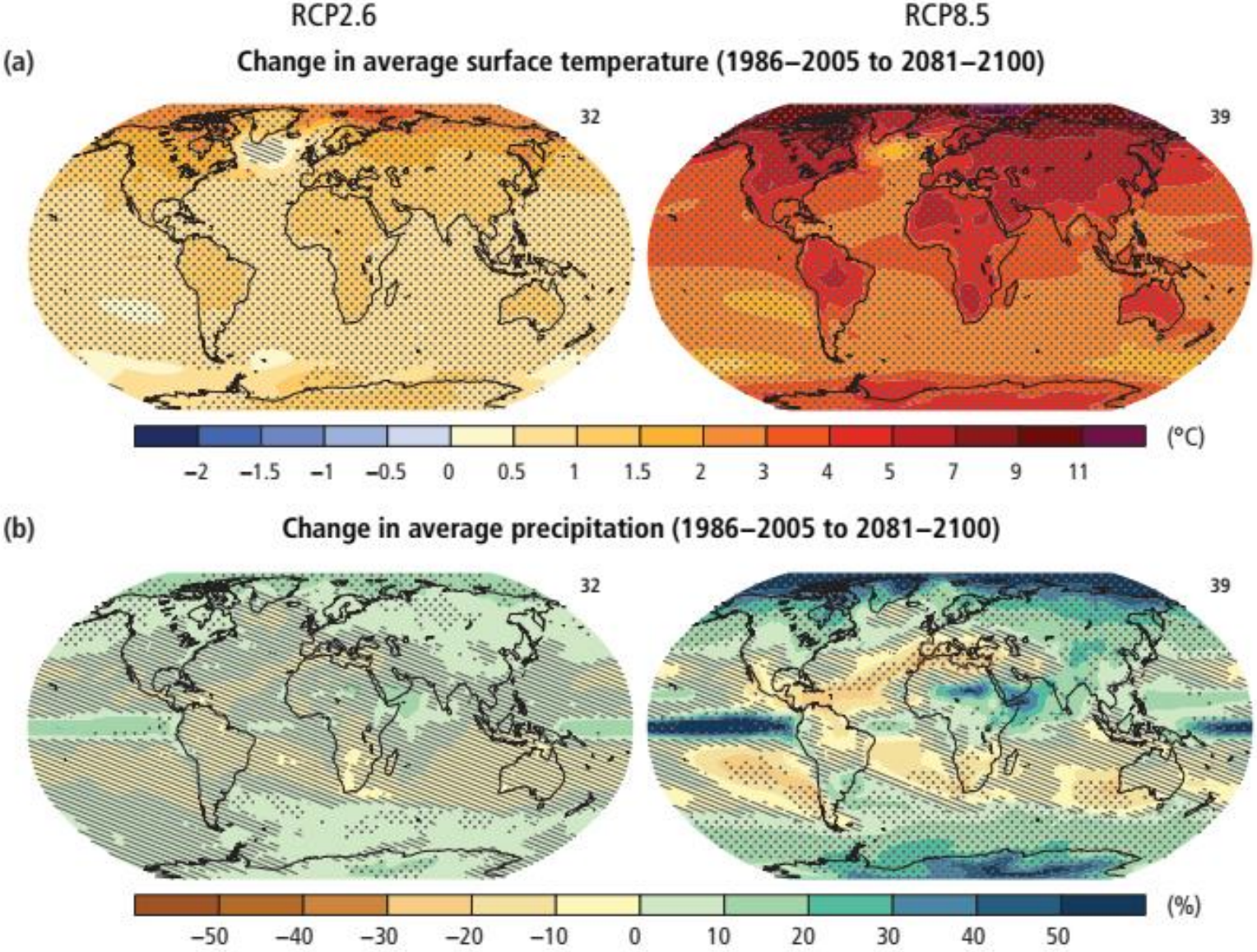


If human-related CO2 emissions continue to increase…

The average temperature will continue to rise !



CLIMATE CHANGE IN THE FUTURE…

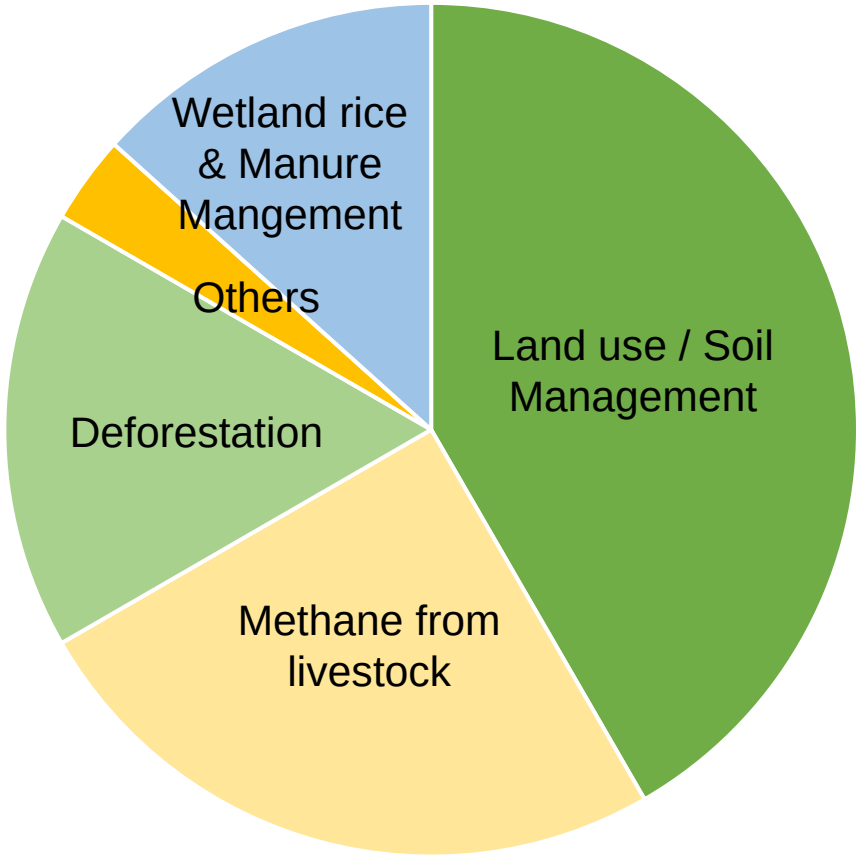


2. CLIMATE CHANGE & AGRICULTURE

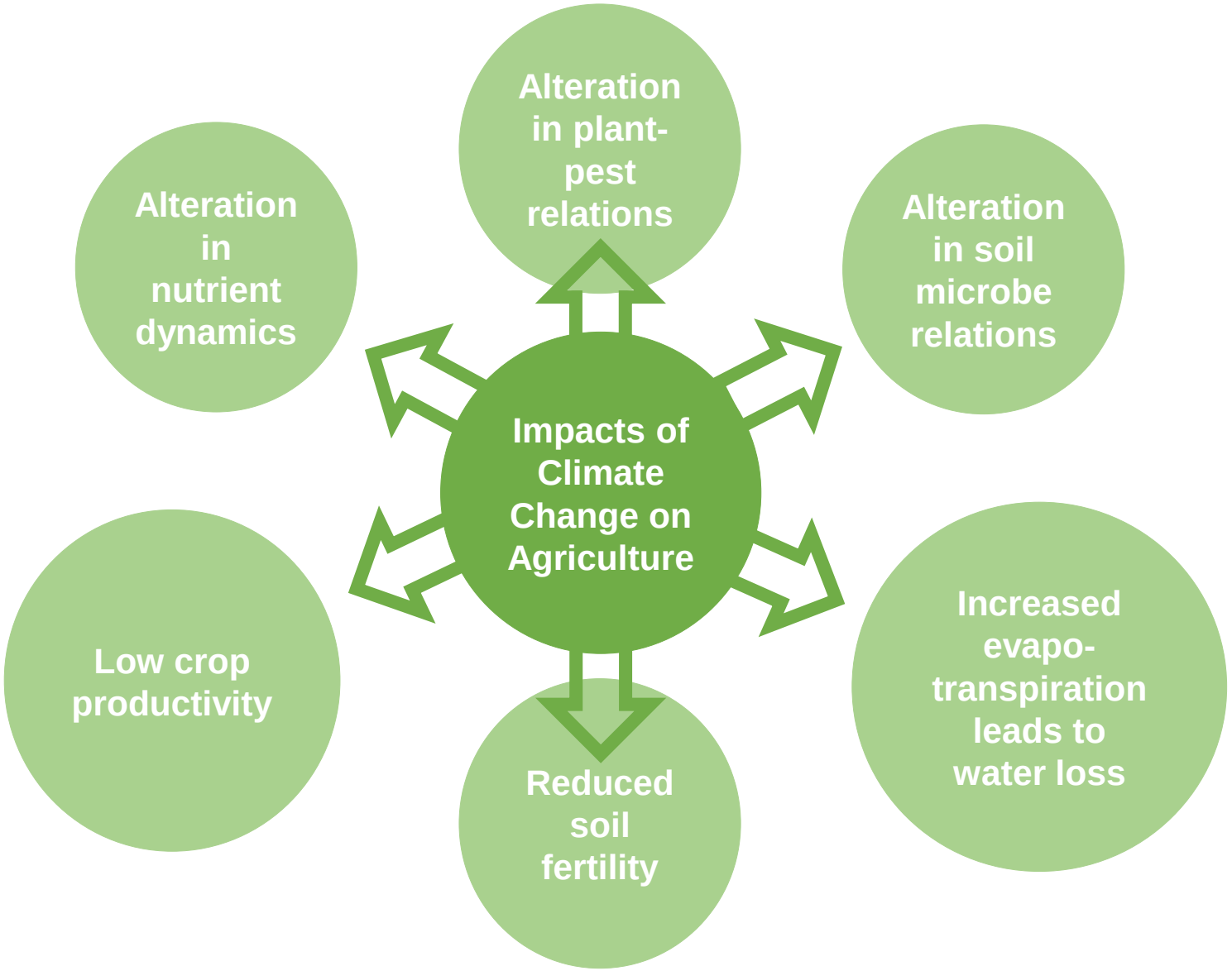
AGRICULTURE'S IMPACT ON CLIMATE CHANGE

- Agriculture is a huge contributor to Climate Change

- Cotton farming has a big role to play when it comes to **deforestation, land-use** and **soil management**

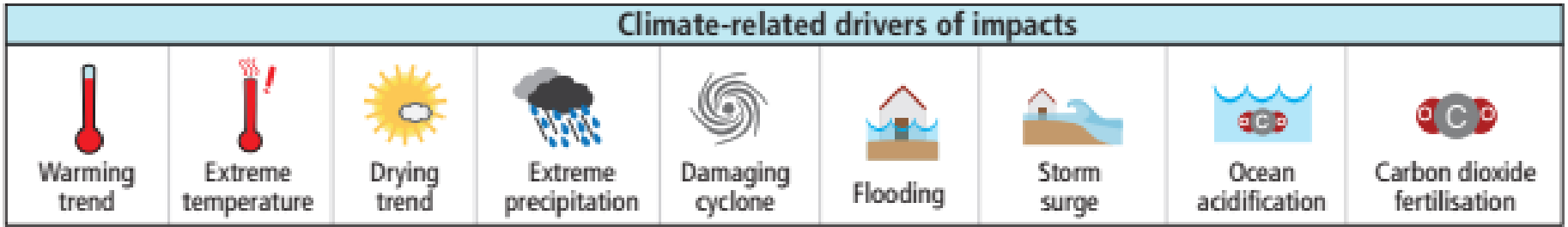


MAIN IMPACTS OF CLIMATE CHANGE ON AGRICULTURE



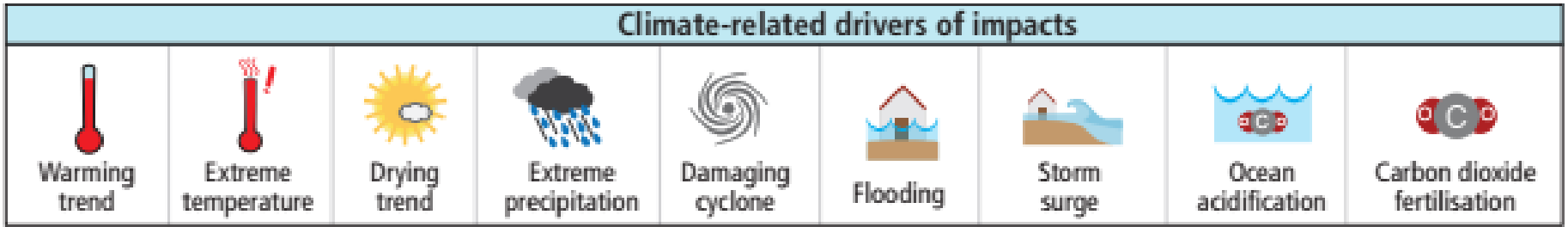
CLIMATE CHANGE'S IMPACT ON AGRICULTURE AND FORESTS

Phenomena	Probability	Main effects on agriculture/forest
Fewer **cold days and nights** (less cold), more hot days and nights (hotter) in most continents	*Almost certain*	Higher yields in cold regions, lower yields in warm regions, more frequent insect invasions
More frequent **heat waves**	*Very likely*	Reduced yields in warmer regions, increased risk of fires
Heavy rainfall more frequent in most regions	*Very likely*	Loss of crops; soil erosion; inability to cultivate waterlogged land

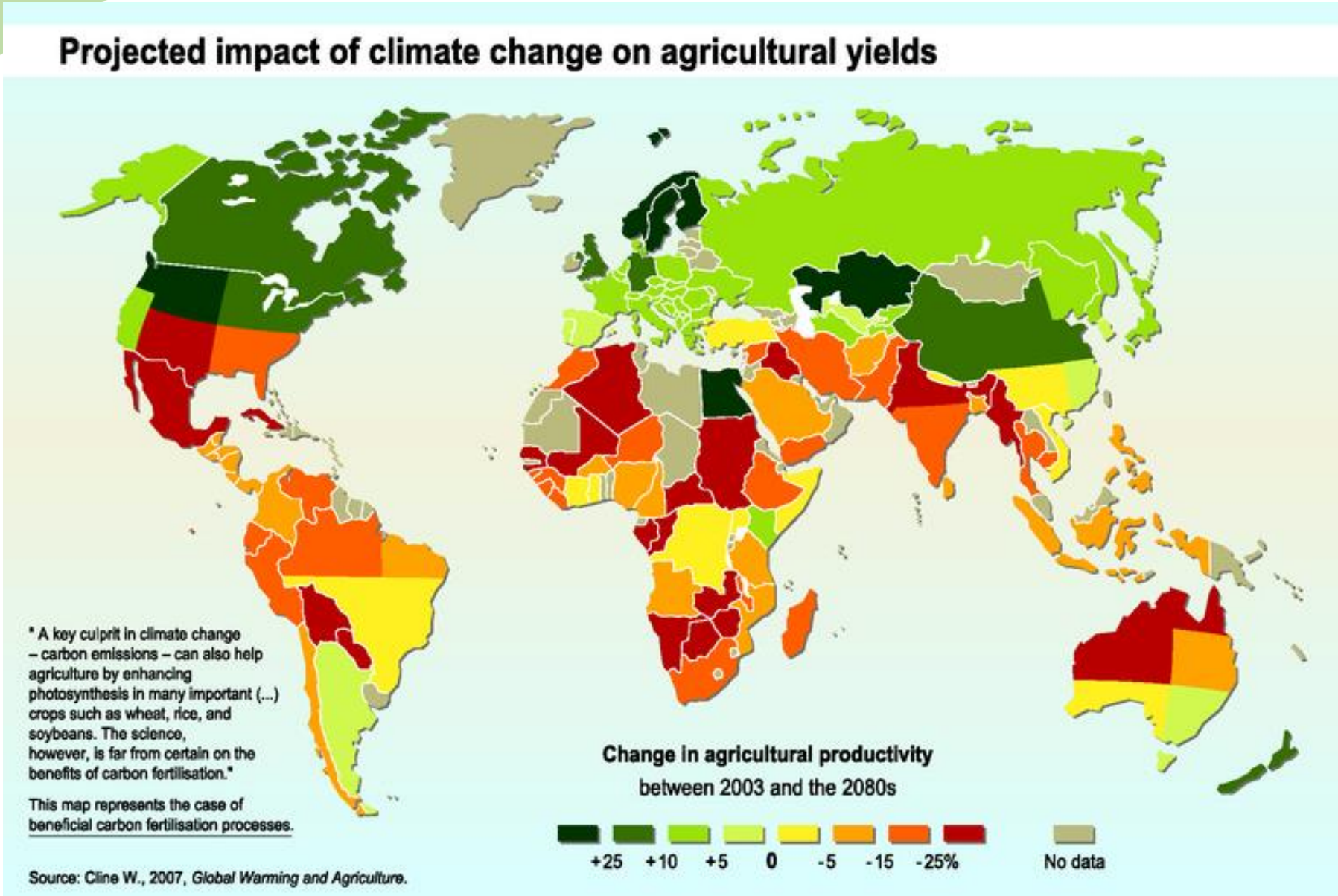


CLIMATE CHANGE'S IMPACT ON AGRICULTURE AND FORESTS

Phenomena	Probability	Main effects on agriculture/forest
Progression of the **drought**	*Probable*	Soil degradation, lower yields, more frequent livestock mortality, increased risk of fires
Increased intense **cyclonic activity**	*Probable*	Loss of crop, uprooting of trees by wind, damage to coral reefs
Increased incidence of episodes of **extreme sea-level rise** (except tsunamis)	*Probable*	Salinization of irrigation water, estuaries and freshwater systems



CLIMATE CHANGE'S IMPACTS ON AGRICULTURAL YIELDS

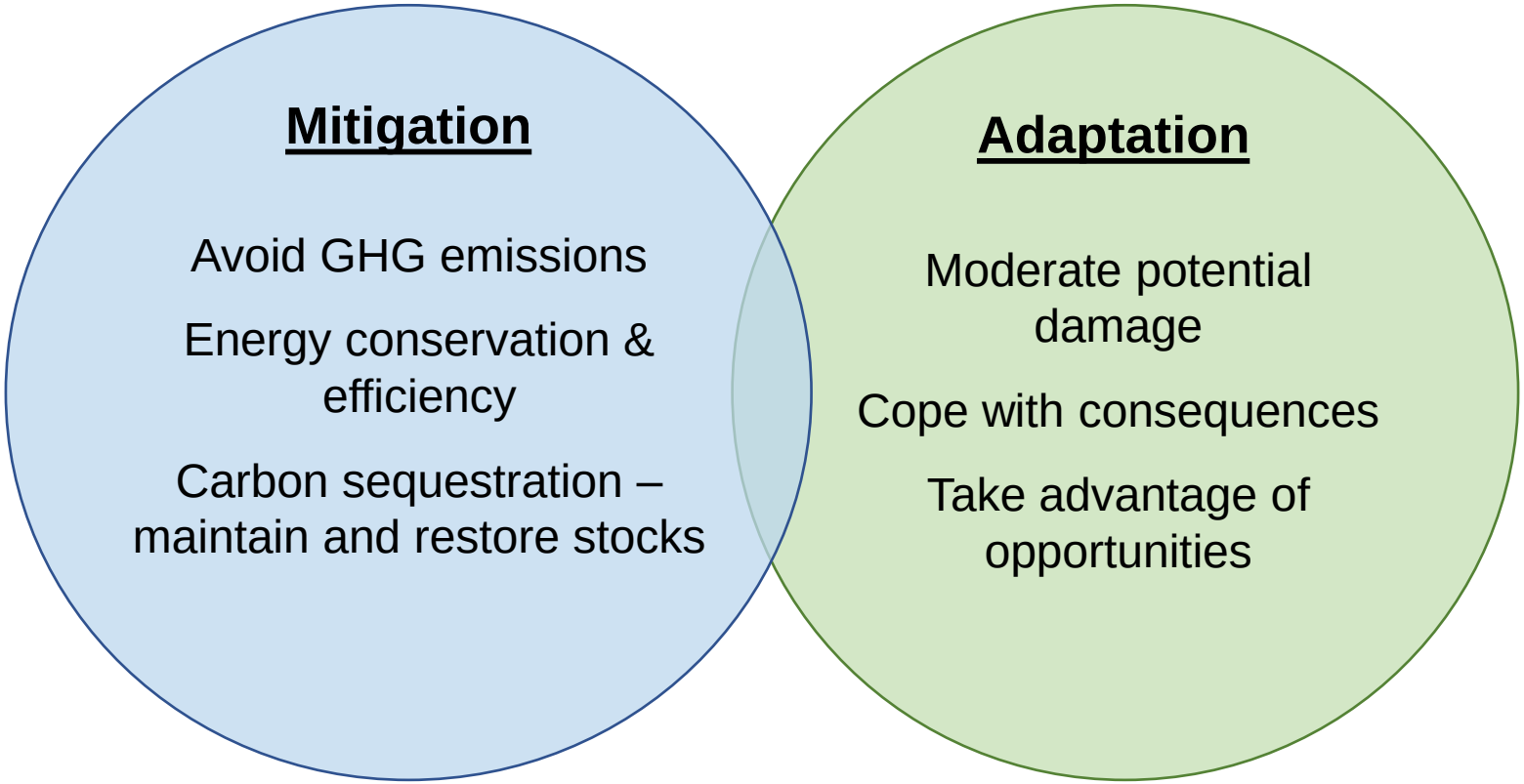


CLIMATE CHANGE AND AGRICULTURE : WHAT TO DO?

- The agricultural sector is able to implement adaptation and/or mitigation strategies and actions

It is named Climate Smart Agriculture !

HOW TO ACHIEVE CLIMATE RESILIENCE ?



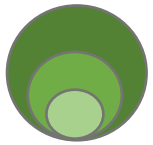
MITIGATION & ADAPTATION

- **Adaptation:** Individual or collective strategies, initiatives and measures aimed at **reducing the vulnerability** of natural and human systems to the actual or expected impacts of climate change through adaptive measures
  i.e.: flexibility of sowing dates, cover crops and crop rotations

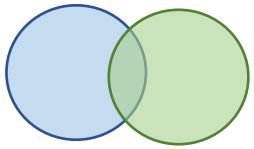
- **Mitigation:** Human intervention **to reduce sources or enhance sinks of greenhouse gases**. Contributes to stabilizing greenhouse gas concentrations in the atmosphere at a level that prevents dangerous human-induced interference with the climate system
  i.e.: tree planting, land use change control, better fertilization management

BUILDING CLIMATE CHANGE RESILIENCE

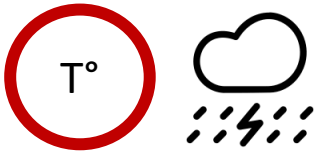
Climate Change Resilience is the ability of people, households, communities, systems and countries to **mitigate, adapt to and recover** from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth



- A multi-scale approach



- A combined action of mitigation and adaptation practices



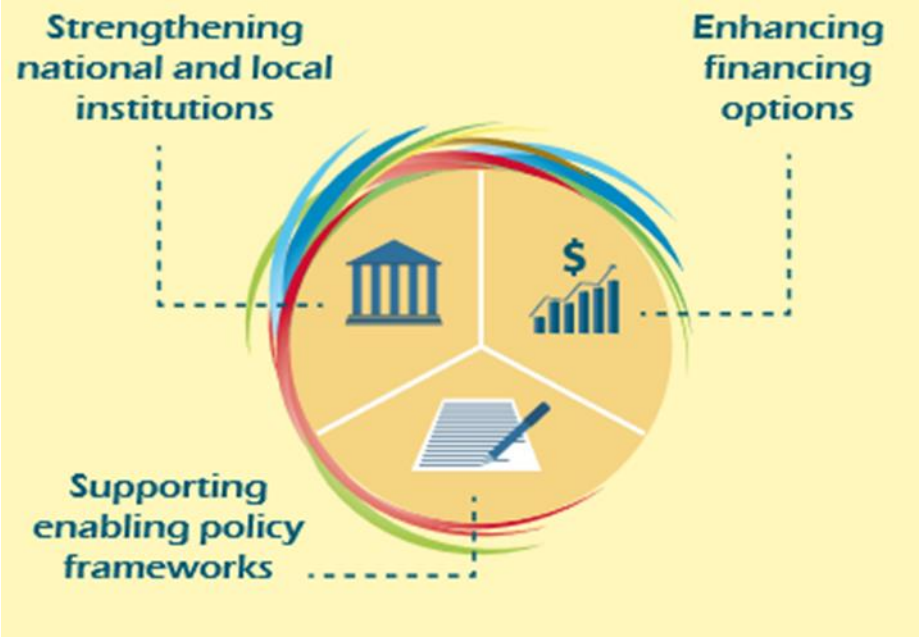
- To resist climatic variability and shocks

→ This is a Climate Smart Agriculture (CSA) Approach

CLIMATE SMART AGRICULTURE'S 3 PILLARS

1

Sustainably increasing farm productivity and income



2

Strengthening resilience to climate change and variability

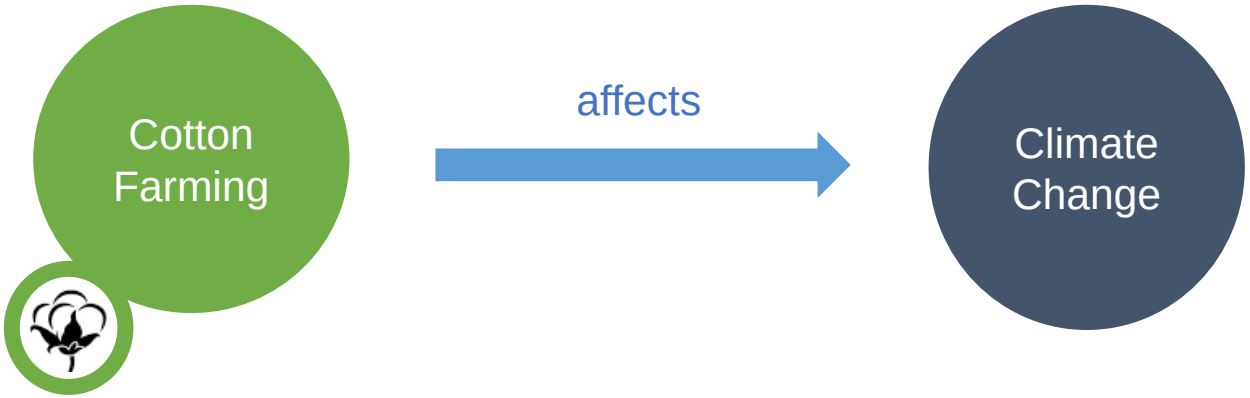
3

Reducing agriculture's contribution to climate change

3. BCI & CLIMATE CHANGE

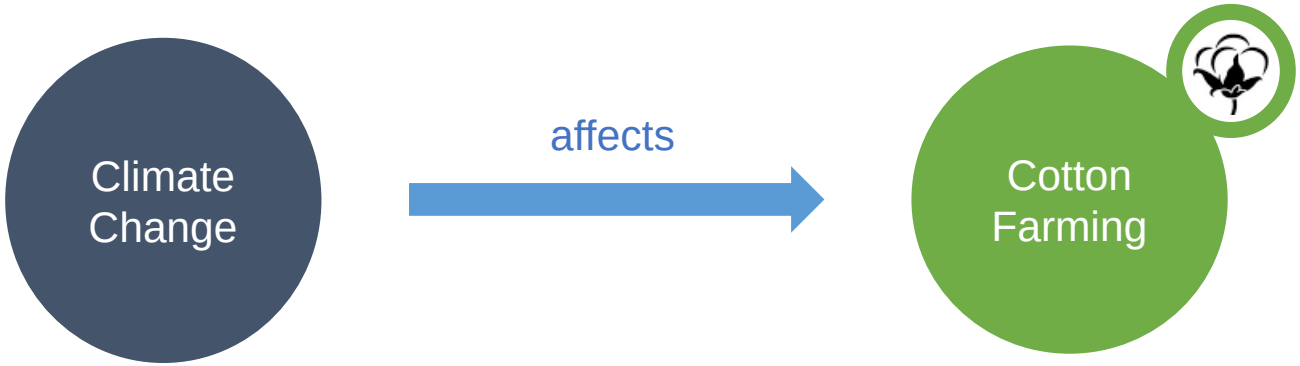
COTTON FARMING CONTRIBUTES TO CLIMATE CHANGE

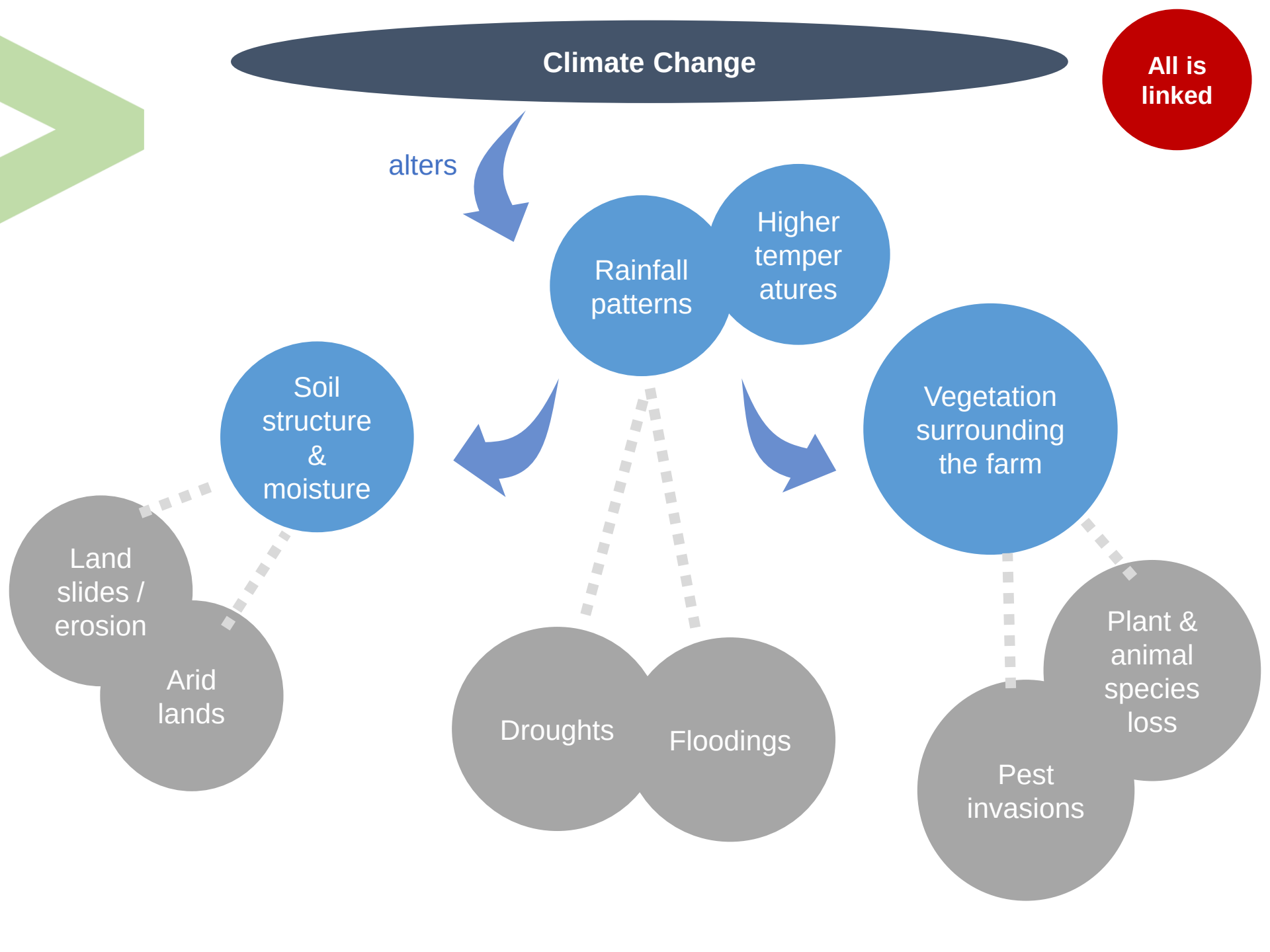
- Cotton farming affects the environment and climate, through:
  - Land conversion and deforestation
  - Pesticides uses
  - Soil management
  - Biodiversity loss (animal & plant species disappear)



THREATS FROM CLIMATE CHANGE TO COTTON FARMERS

- Cotton is highly dependent on the climate it grows in
- Climate Change can affect:
  - Soil: fragile soil structure, soil erosion, low soil moisture, arid lands
  - Water: unpredictable rainfall patterns, droughts and/or flooding, fires, possible drop of 50% rainfed agriculture yield
  - Biodiversity: vegetation & animal loss
  - IPM: beneficial insects disappear, pest invasions
  - Overall: Arable land scarcity; migration to other lands or to cities; less labour forces




Climate Change
All is linked
alters
Rainfall patterns
Higher temperatures
Soil structure & moisture
Vegetation surrounding the farm
Land slides / erosion
Arid lands
Droughts
Floodings
Plant & animal species loss
Pest invasions

BCI COUNTRIES AND CLIMATE CHANGE RISKS

- Where do BCI countries stand in terms of Climate risks?

7th	Madagascar
12th	USA
14th	India
18th	Australia
28th	Mozambique
31st	China
33rd	Pakistan
67th	Kazakhstan
72nd	Turkey
78th	South Africa
79th	Brazil
107th	Tajikistan
124th	Israel
124th	Mali

Ranking by Germanwatch (2017); from 1st to 177th

CASE STUDY: HOW CLIMATE CHANGE AFFECTS BCI FARMERS IN PAKISTAN

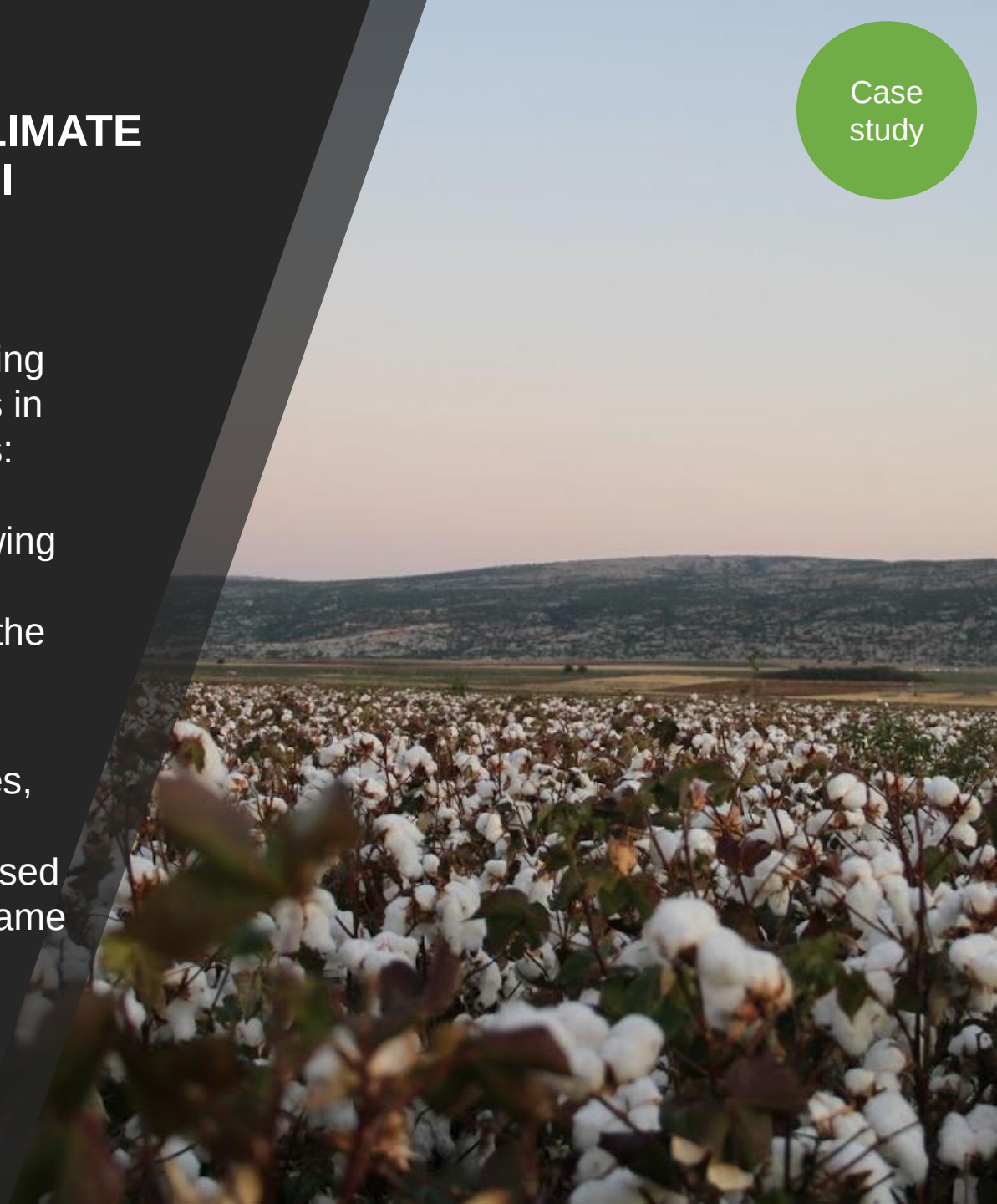
Case study

- In 2019, higher temperatures favored the growth of pest populations; Whitefly & Locust became resistant to pesticides due to their frequent use; all pest control strategies failed to perform
- Big changes in weather patterns in 2018, including:
  - Floods, especially for crops being cultivated in riverine areas
  - Droughts or water shortage in Punjab and Sindh
- High temperatures in Southern Punjab in April 2019, along with big day & night T° fluctuation
- In 2010, 2012, 2013 and 2016, heavy rain and flood severely damaged crops in Sindh and Punjab
- Soil is degraded in most areas of the country

Case study

CASE STUDY: HOW CLIMATE CHANGE AFFECTS BCI FARMERS IN TURKEY

- BCI farmers have been facing unusual weather conditions in the past few years, such as:
  - extreme precipitations during harvest and sowing periods
  - extreme hot air during the vegetation period
- As a result of those changes, the number of Aphids (ap-sucking insects) has increased and pest management became very hard

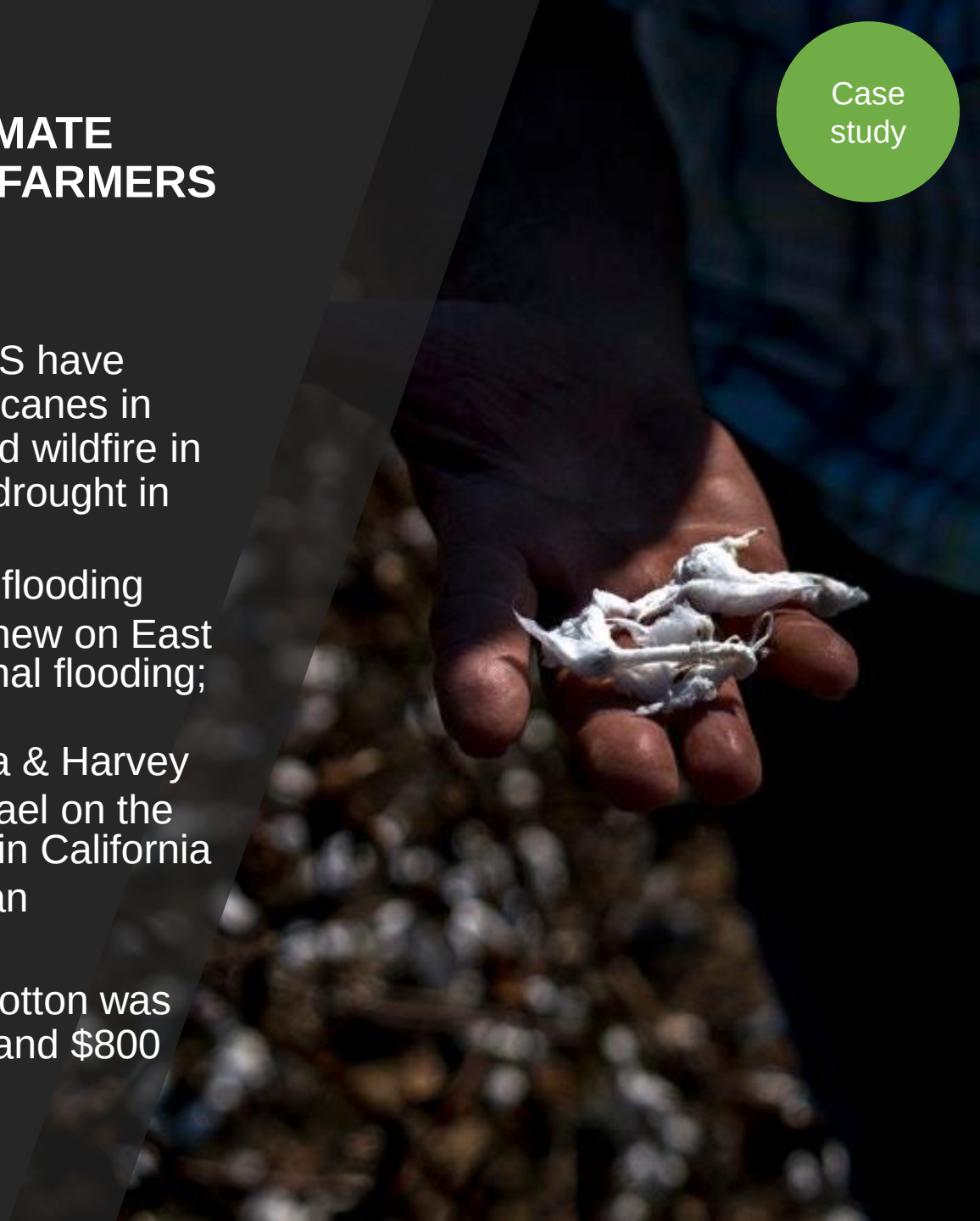


CASE STUDY: HOW CLIMATE CHANGE AFFECTS BCI FARMERS IN THE US

Case study

- BCI Large Farms in the US have been facing stronger hurricanes in the southeast, drought and wildfire in the west, and floods and drought in the mid-south:
  - 2015: South Carolina flooding
  - 2016: Hurricane Matthew on East Coast caused additional flooding; wildfires in California
  - 2017: Hurricanes Irma & Harvey
  - 2018: Hurricane Michael on the East Coast; Wildfires in California
  - 2019: Hurricane Dorian

- In 2018, the damage on cotton was estimated between $300 and $800 million USD



CASE STUDY: HOW CLIMATE CHANGE AFFECTS BCI FARMERS IN MOZAMBIQUE

Case study

- During the past 3 years, BCI smallholders in Mozambique have been facing tropical cyclones, droughts (every 3 to 4 years) and river/coastal storm surge flooding
- Cyclone Idai and Kenneth (2020)
- Thousands of hectares of cotton crops flooded, production losses affecting smallholder farmers'income and country's export earnings

CASE STUDY: HOW CLIMATE CHANGE AFFECTS BCI FARMERS IN MADAGASCAR

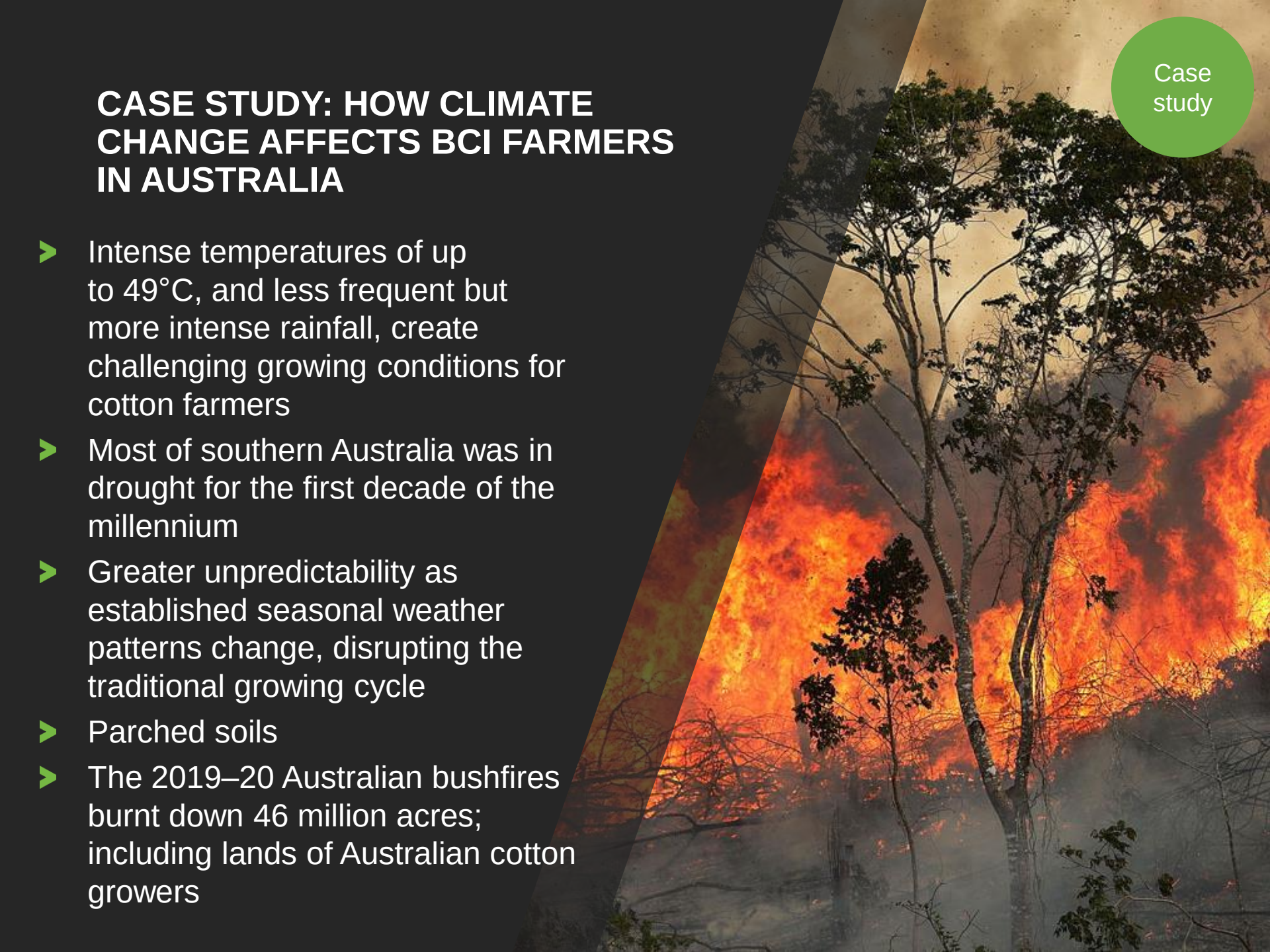
Case study

- Madagascar is the 7th most vulnerable country to Climate Change
- Cotton farmers rely solely on rainfall to water their crops
- However during these past 3 years, rainfall has declined dramatically while temperatures have risen
- Ahead of the cotton growing season, the Alizé wind blows for twice as long, displacing the precious nutrient-rich top soil, which is already baked dry by the heat
- When there isn't enough rain, or it arrives late, seeds perish in the soil and farmers have to plant again, delaying the growing season and increasing theirs costs
- Since 2000, cotton farmers have experienced as much as a 50% drop in yields and income

Case study

CASE STUDY: HOW CLIMATE CHANGE AFFECTS BCI FARMERS IN AUSTRALIA

- Intense temperatures of up to 49°C, and less frequent but more intense rainfall, create challenging growing conditions for cotton farmers
- Most of southern Australia was in drought for the first decade of the millennium
- Greater unpredictability as established seasonal weather patterns change, disrupting the traditional growing cycle
- Parched soils
- The 2019–20 Australian bushfires burnt down 46 million acres; including lands of Australian cotton growers



CLIMATE CHANGE IN THE BCI PRINCIPLES & CRITERIA

- Climate change is a cross-cutting issue in the BCI Principles & Criteria
- It relates to:
  - Pesticides Management (Principle 1)
  - Water Stewardship (Principle 2)
  - Soil Health (Principle 3)
  - Biodiversity & Land-Use (Principle 4)
- **BCI is an opportunity to work together with farmers and face this common issue by promoting and implementing climate smart practices**

BCI'S CLIMATE CHANGE POLICY

- BCI joined the United Nations Framework Convention on Climate Change (UNFCCC) Fashion for Global Climate Action initiative in June 2019

"This is a race we can – and must – win to avoid significantly worsening the risk of droughts, floods, extreme heat and poverty for hundred of millions of people."

BCI'S APPROACH TO CLIMATE CHANGE

- Step 1: Identify key issues linked to Climate Change
- Step 2: Identify adequate Mitigation Measures
- Step 3: Identify Adaptation Measures
- Step 4: Promote & support CSA funding & collaboration at field level
- Step 5: Compile data to create a Climate Change Plan and complete the CIP

BCI'S CLIMATE CHANGE STRATEGY

- A Climate Change strategy is currently being developed by BCI to be finalised by the end of the year 2020

- It aims to:
  - Demonstrate the positive impact of farming areas under BCI programs in term of GHG emission
  - Build resilience among farming communities
  - Contribute to the global agenda on mitigation and adaptation in the agricultural sector
  - Transform BCI into a climate-friendly organisation

ASSESSMENT

QUIZ: QUESTION 1

What is true about the greenhouse effect?

Humans have very little impact on climate change

Natural emissions of Greenhouse gases are balanced with the absorptions of those gases

The effect is caused by the warming of the Earth's atmosphere via sun and infrared radiations

Deforestation is a main driver of GHG accumulation into the atmosphere

QUIZ: QUESTION 1

What is true about the greenhouse effect?

Humans have very little impact on climate change

Natural emissions of Greenhouse gases are balanced with the absorptions of those gases

The effect is caused by the warming of the Earth's atmosphere via sun and infrared radiations

Deforestation is a main driver of GHG accumulation into the atmosphere

QUIZ: QUESTION 2

What is the difference between weather and climate?

The climate is the long term observations of atmospheric conditions

The weather is affected by temperature, pressure, humidity, cloudiness, wind, precipitation, rain, flooding, ice storms, etc.

They are the same

The weather is only refering to short-time changes

QUIZ: QUESTION 2

What is the difference between weather and climate?

The climate is the long term observations of atmospheric conditions

The weather is affected by temperature, pressure, humidity, cloudiness, wind, precipitation, rain, flooding, ice storms, etc.

They are the same

The weather is only refering to short-time changes

QUIZ: QUESTION 3

What are the main sources of GHG emissions on earth?

Oceans	Deforestation
Agriculture	Fossil fuel combustion

QUIZ: QUESTION 3

What are the main sources of GHG emissions on earth?

Oceans	Deforestation
Agriculture	Fossil fuel combustion

QUIZ: QUESTION 4

What are the main consequences of climate change on agriculture?

- Reduced soil fertility
- Alteration in plant-pest relations
- High crop productivity
- Increased evapo-transpiration leading to water loss

QUIZ: QUESTION 4

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QUIZ: QUESTION 5

How does cotton production mainly contributes to Climate Change?

?	?
Soil depletion	Deforestation & Land-use

QUIZ: QUESTION 5

How does cotton production mainly contributes to Climate Change?

?	?
Soil depletion	Deforestation & Land-use

QUIZ: QUESTION 6

How can we cope with the greenhouse effect?

By adopting Climate-Smart Agriculture (CSA) good practices	?
By changing the crop	By adopting a mix of Climate Change adaptation and mitigation measures

QUIZ: QUESTION 6

How can we cope with the greenhouse effect?

By adopting Climate-Smart Agriculture (CSA) good practices

?

?

By adopting a mix of Climate Change adaptation and mitigation measures

QUIZ: QUESTION 7

How does BCI plan to contribute to Climate Change Mitigation and Adaptation?

By developping a Climate Change Strategy

?

By adopting best practices related to Pesticides, Water Stewardship, Soil Health, Biodiversity & Land-Use Management

By building resilience among farming communities

QUIZ: QUESTION 7

How does BCI plan to contribute to Climate Change Mitigation and Adaptation?

By developping a Climate Change Strategy

?

By adopting best practices related to Pesticides, Water Stewardship, Soil Health, Biodiversity & Land-Use Management

By building resilience among farming communities

QUIZ: QUESTION 8

What does Climate Change resilience entail?

- To resist climatic variability and shocks
- A multi-scale approach
- no consequences of climate change for cotton cultivation
- A combined action of mitigation and adaptation practices

QUIZ: QUESTION 8

What does Climate Change resilience entail?

To resist climatic variability and shocks

A multi-scale approach

no consequences of climate change for cotton cultivation

A combined action of mitigation and adaptation practices

QUIZ: QUESTION 9

What are Climate Smart Agriculture (CSA)'s 3 pillars?

?	Strengthening resilience to climate change and variability
Sustainably increasing farm productivity and income	Reducing agriculture's contribution to climate change

QUIZ: QUESTION 9

What are Climate Smart Agriculture (CSA)'s 3 pillars?

?

Strengthening resilience to climate change and variability

Sustainably increasing farm productivity and income

Reducing agriculture's contribution to climate change

QUIZ: QUESTION 10

Kindly rank BCI's 5 steps approach to Climate Change, in the right order:

1. Identify adequate Mitigation Measures
2. Promote & support CSA funding & collaboration at field level
3. Compile data to create a Climate Change Plan and complete the CIP
4. Identify key issues linked to Climate Change
5. Identify Adaptation Measures

QUIZ: QUESTION 10

Kindly rank BCI's 5 steps approach to Climate Change, in the right order:

1. Identify key issues linked to Climate Change
2. Identify adequate Mitigation Measures
3. Identify Adaptation Measures
4. Promote & support CSA funding & collaboration at field level
5. Compile data to create a Climate Change Plan and complete the CIP