ActNow

Training Package and Trainer's Manual

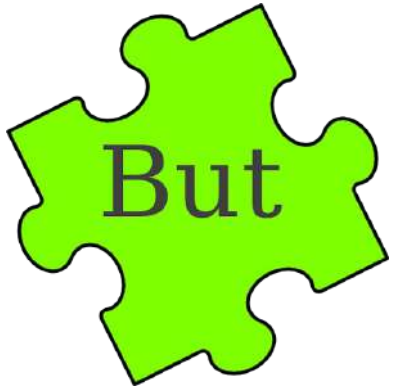
Co-funded by the Erasmus+ Programme of the European Union

 [2020-3-CY02-KA205-001979]

https://www.actnow-europa.eu/

ActNow Project Rationale

There is a Scientific urgency need to mitigate anthropogenic climate change



- There is a gap between scientific and public understanding of the risks posed by climate change
- For the 1st time, Climate change is ranked as the top priority with 32% by European citizens
- Only 12 EU member countries consider it as a top priority

ActNow Project Aims

To build the capacity of youth workers:

- to better integrate climate change and,
  - sustainable development topics in their practice

- and further development issues into formal and non-formal education systems

Based on innovative educational material such as Mobile Augmented Reality Games and Simulation Games

ActNow Project Objectives

1. Develop a broad set of knowledge, skills, attitudes and values to sensitize, recruit, mobilise and adequately support youth workers and the youth enabling them to critically reflect on climate change as a major environmental challenge that requires immediate action,

2. Build the capacity of front-line youth workers professionals and educators to use bespoke Mobile Augmented Reality and Simulations Games;

3. Provide youth workers and youth professionals with the tools and methodology to implement, evaluate and assess key competences of young people through action research based;

4. Make use of the existing AR and Simulation games platforms and provide youth workers with the necessary technical knowledge to create their content for fostering young people key competences through learning about Climate Change;

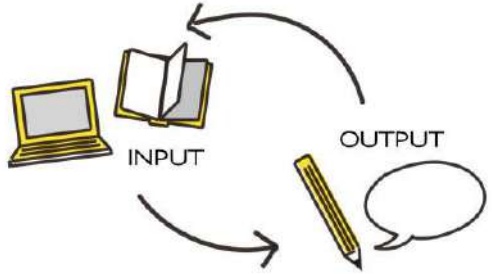
5. Develop knowledge and critical understanding of climate change and sustainable development issues.

ActNow Project Outputs

IO1: Augmented Reality Training Package and Trainer's Manual

IO2: Simulation Game

IO3: MOOC for climate action



IO4: Policy & Practice Recommendations for living a more sustainable

lifestyle at the national and EU Level

The Training Package

Module 1: Climate Change Impacts and effects on Water

I. Sea level rise
II. Water Temperature

Module 2: Climate Change impacts on Humans

I. Climate Change Immigrants
II. Agriculture Production

Module 3: Climate Change impacts on Wildlife and nature

I. Desertification
II. Extreme weather events

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Climate Change Impacts and Effects on Water (M1)

Prepared by CARDET & ITTI

Co-funded by the Erasmus+ Programme of the European Union

Energizer

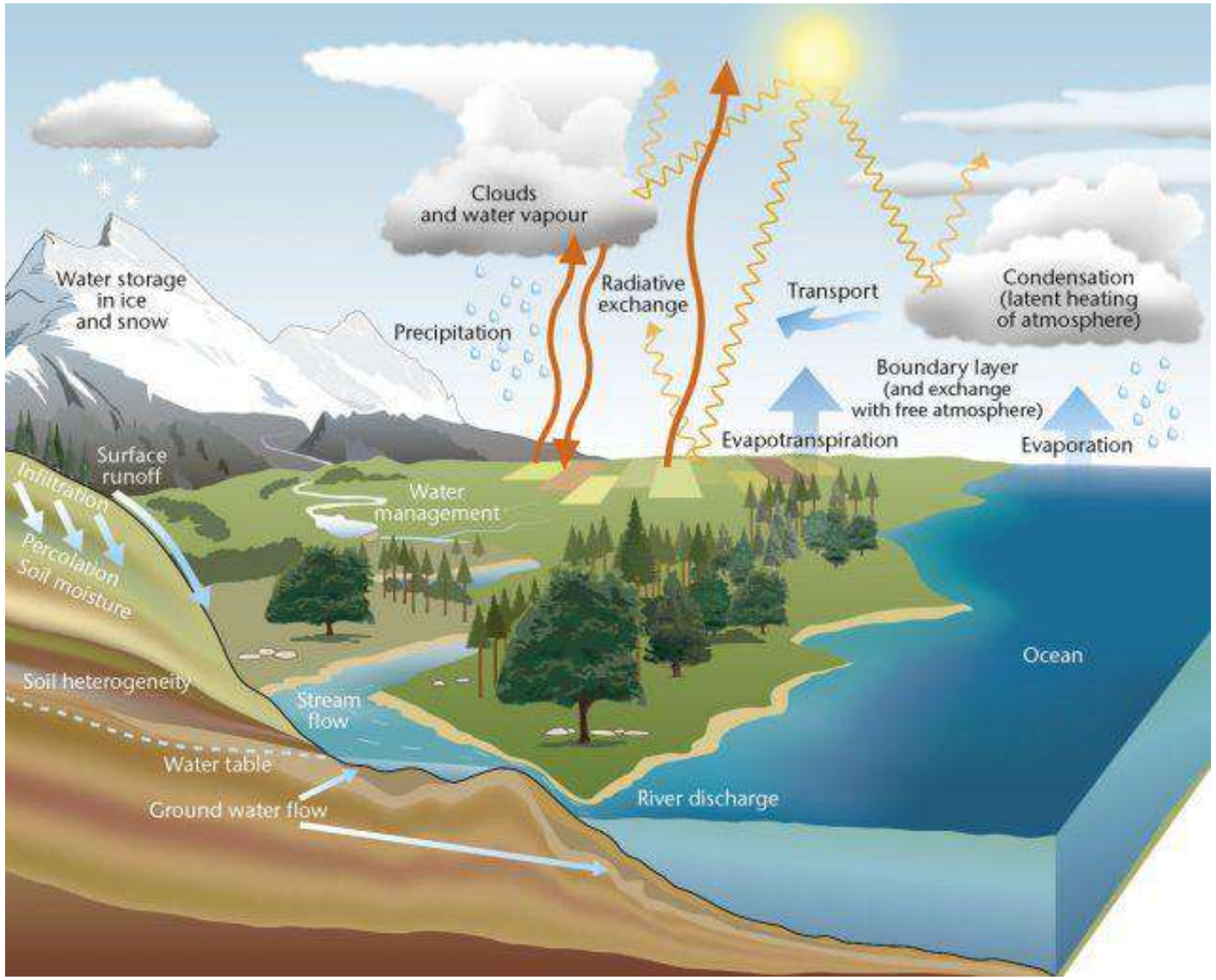
Introduction to Module 1 - Climate Change Impacts and Effects on Water

In this module we will explore:

i. The Climate Change impacts in relation to Sea Level Rise

ii. The Climate Change impacts in relation to the Water Temperature

How Climate Change Impacts Our Water



Source: *https://news.climate.columbia.edu/2019/09/23/climate-change-impacts-water/*

Global warming is altering nearly every stage in the diagram

Sort by importance of impact to Climate Change

Evaporation

Oceans

Snowpack

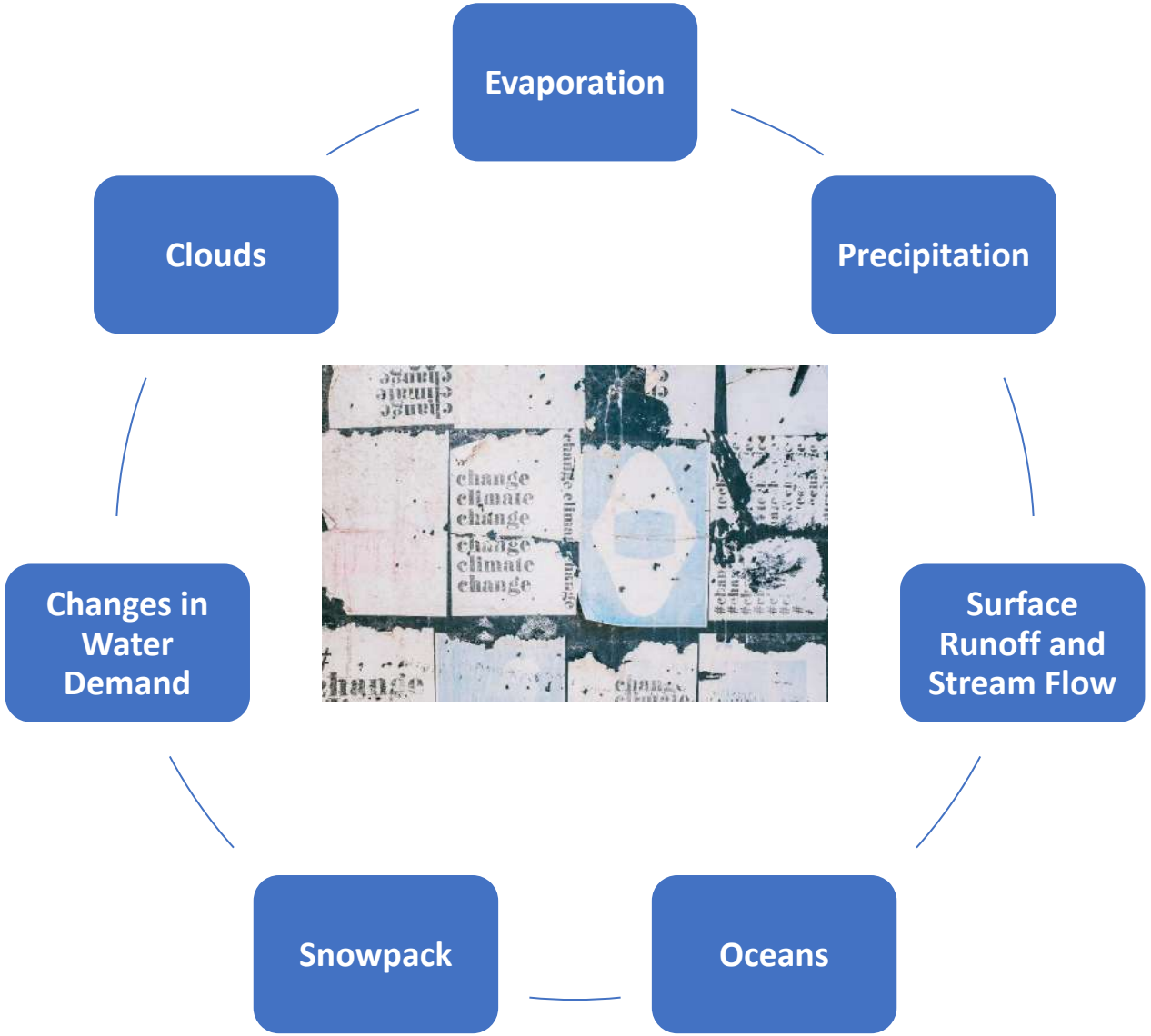
Clouds

Surface Runoff and Stream Flow

Precipitation

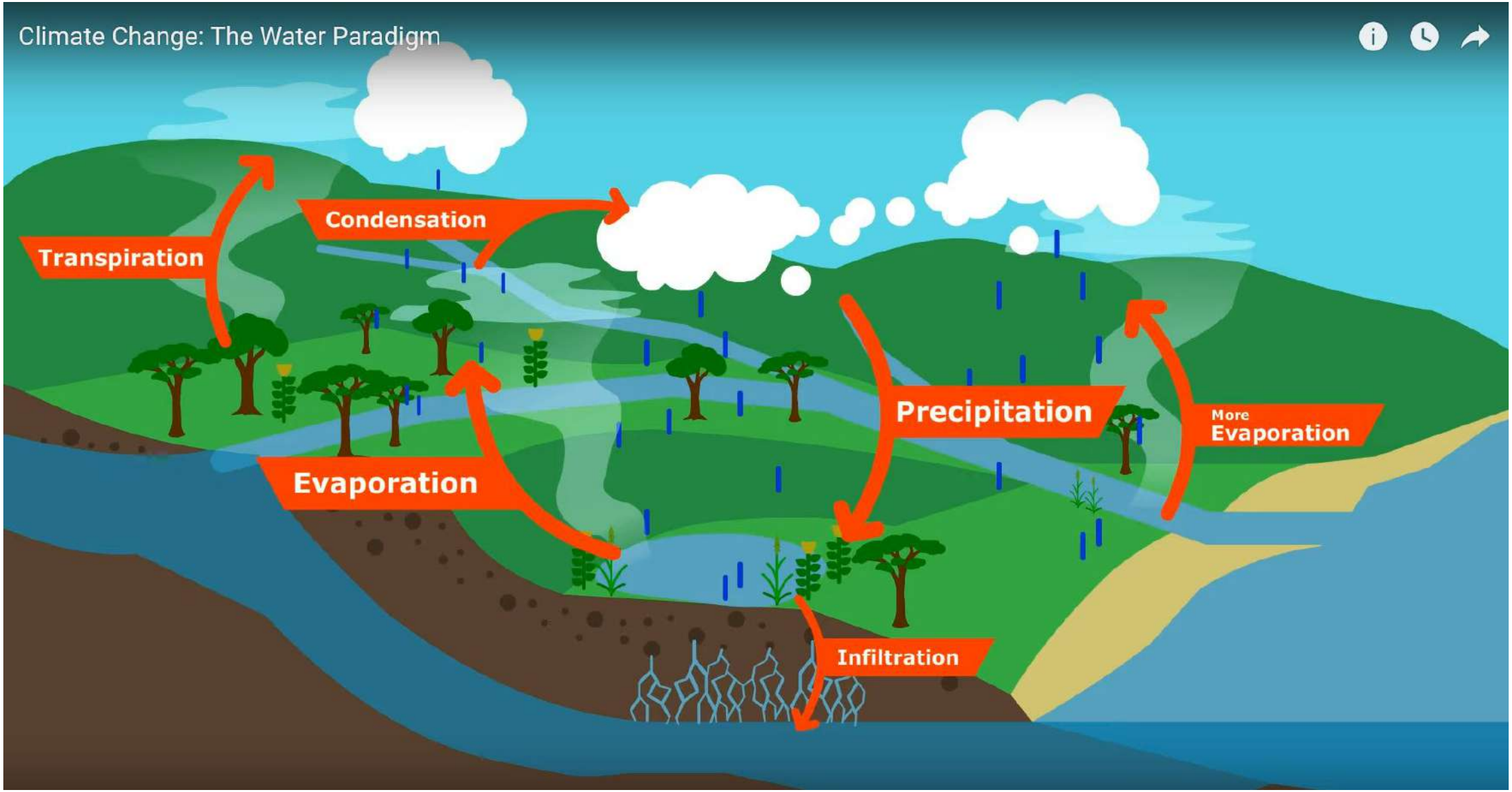
Changes in water demand

How Climate Change Impacts Our Water



Source: https://news.climate.columbia.edu/2019/09/23/climate-change-impacts-water/

Click to play



M1 U1 Sea Level Rise

Prepared by CARDET

Co-funded by the Erasmus+ Programme of the European Union

Introduction to Module 1: Climate Change and effects on water

In this module we will explore:

I. What is the sea level rise issue

II. How to help young people understand the issue of sea level rise

III. How to help young people understand the interlink between sea level rise and climate change

On completion of this module you will have...

On successful completion of this Module, youth workers, trainers, and youth leaders will be able to:	Knowledge	Skills	Attitudes
Sea Level Rise - origin and consequences	Discuss the importance of the origin of the sea-level rise and what are the consequences.	Demonstrate how to evaluate and analyse the origin and the consequences of the sea-level rise.	Willingness to support young people through the knowledge gained on the sea level rise issue.
Climate Change and Sea Level Rise – direct link	Develop an understanding of the concept of climate change and the direct link with the sea level rise.	Learn specific steps and individual tools to demonstrate the direct link.	Be open to supporting young people to enhance their knowledge and tools on the issue.
Climate Change and Sea Level Rise – indirect link	Develop an understanding of the concept of climate change and the indirect link with the sea level rise.	Learn specific steps and individual tools to demonstrate the indirect link.	Awareness of how to respond to and support young people in the delivery of the topic.

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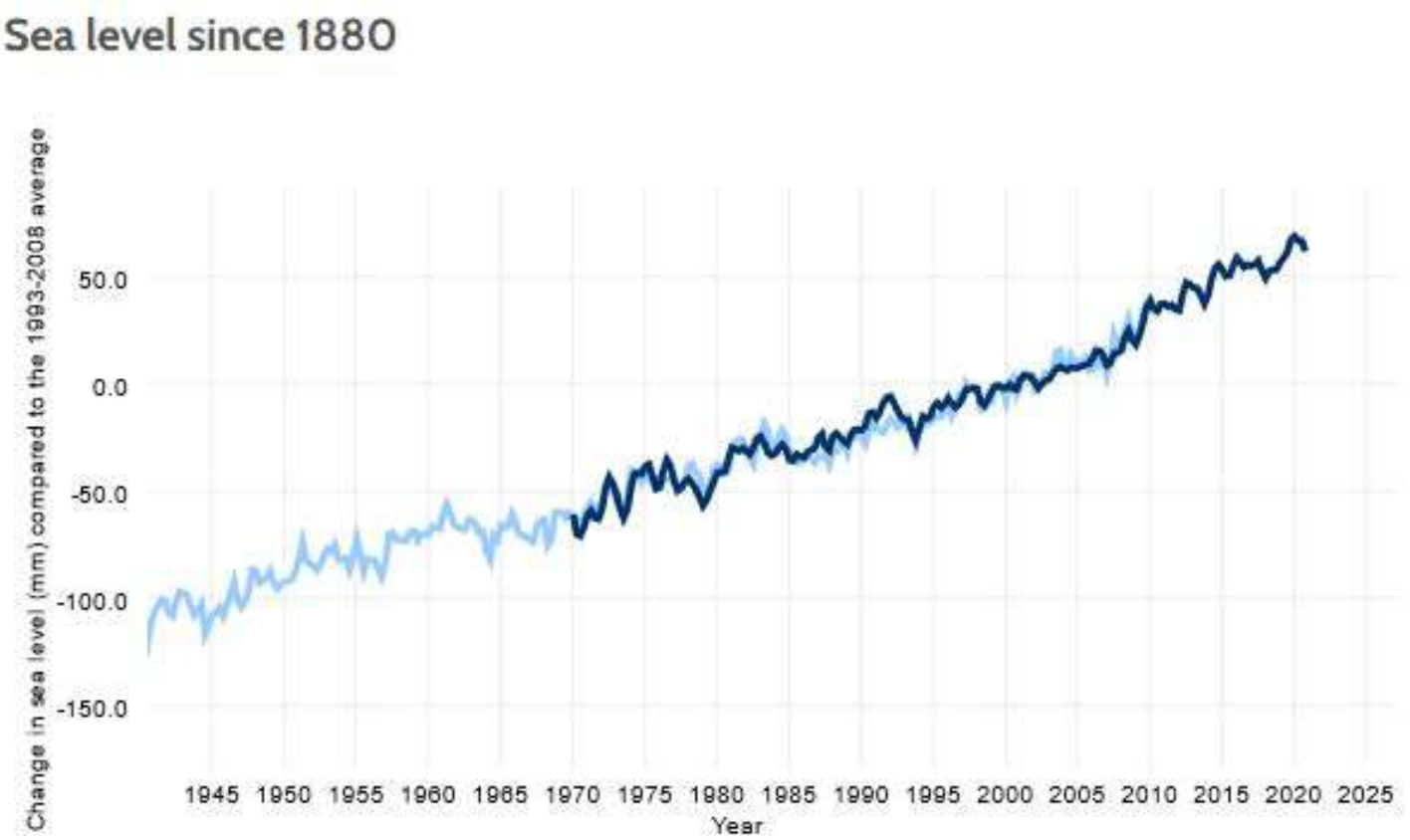
What are the key considerations to bear in mind when thinking of climate change and sea level rise?

Facts

21-24cm increase since 1880

Interactive Graph



The problem

- Globally, 8 of the world's 10 largest cities are near a coast
  (U.N. Atlas of the Oceans)

<u>Risk from sea level rise.</u>

Roads, bridges, subways, water supplies, oil and gas wells, power plants, sewage treatment plants, landfills are all at

Source: https://www.pexels.com/photo/high-rise-buildings-513799/

The problem

- Destructive erosion
- Wetland flooding
- Aquifer and agricultural soil contamination with salt
- Lost habitat for fish, birds, and plants.
- More dangerous hurricanes and typhoons

(Lindsey, R. L 2021)

Link: https://www.pexels.com/photo/white-concrete-high-rise-building-near-sea-at-daytime-1124247/

What Causes Sea Level Rise? (Click to play)

ICE MELT

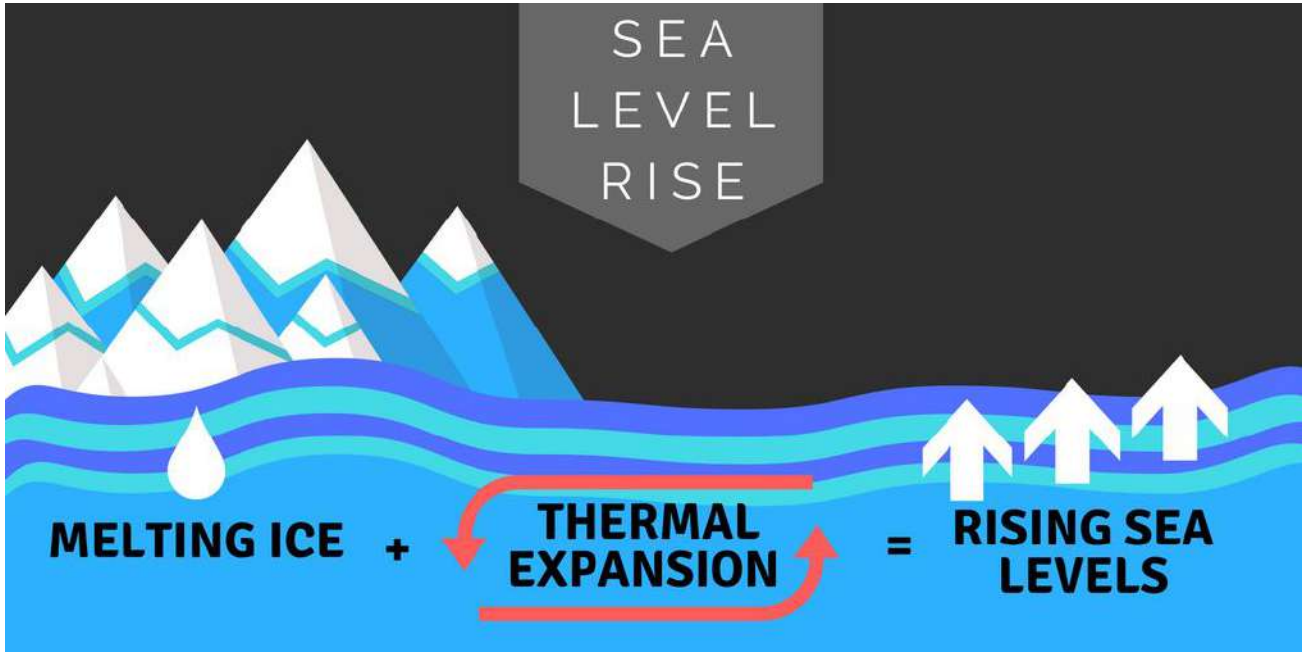
Due to the warming atmosphere and ocean, ice sheets and mountain glaciers are melting, resulting in the addition of freshwater into the ocean.

Source: Nikolas Athinis

Source: Nikolas Athinis

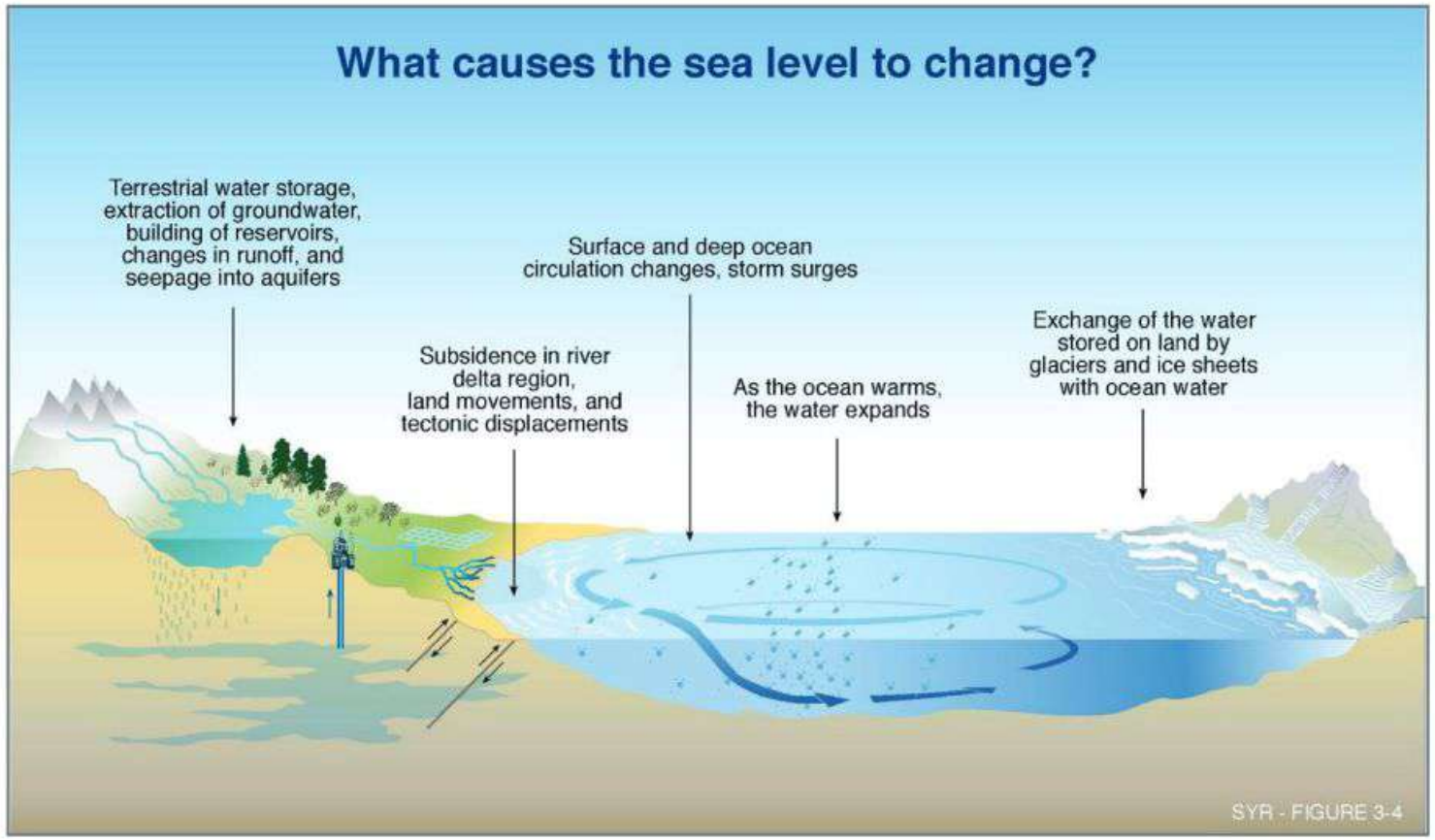
Thermal Expansion

Ocean water expands as it absorbs trapped heat, causing sea levels to rise.

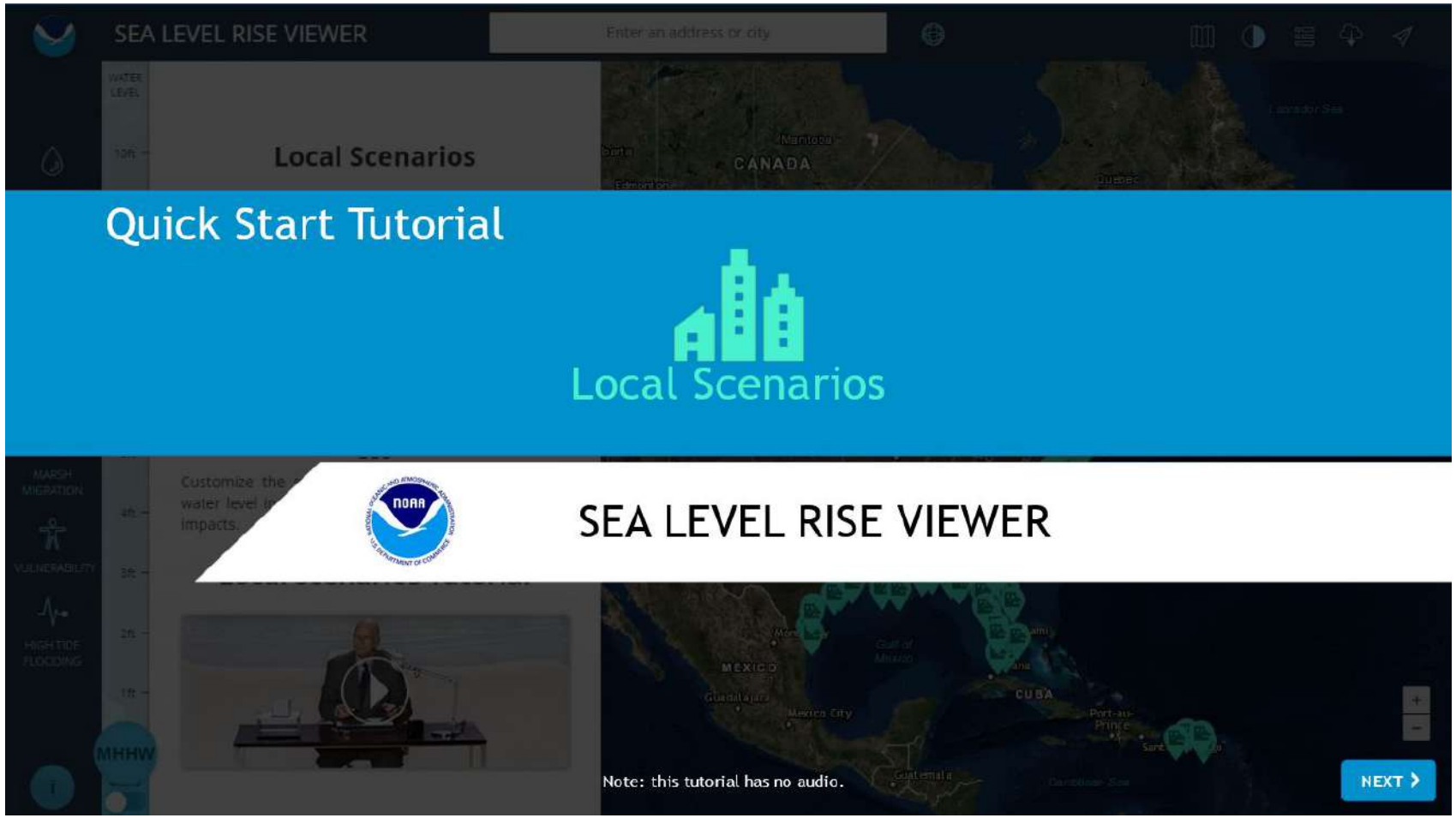


Land Water Storage

Water that is either removed from land (through groundwater pumping, for example) or impounded on land (through dam building, for example) can cause a net change in the total water found in the ocean.



Scenarios (link)



Scenarios

https://coast.noaa.gov/slr/#

Assessment

1. What causes the level of the water to rise and sink all day long?

2. The average height of the ocean in a particular place is called the _____ _____ _____.

3. NASA measures the average sea level of the whole ocean from space. What is another name for the average sea level of the whole ocean?

4. True or False: As Earth warms, the ocean warms, too.

5. What is the name of the NASA satellites that measure global sea level?

Source: Facebook

Further Material

- http://www.oceansatlas.org/about/en/
- https://sealevel.nasa.gov/
- https://coast.noaa.gov/digitalcoast/training/slr-tutorial.html
- https://www.floodmap.net/
- https://www.inverse.com/article/21722-underestimated-global-sea-level-rise-greenland-hawaii-nasa

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Nunez, C. (2021, May 3). *Sea level rise, explained*. Environment. https://www.nationalgeographic.com/environment/article/sea-level-rise-1

Overview. (2021). NASA Sea Level Change Portal. https://sealevel.nasa.gov/understanding-sea-level/overview

Rising Waters: How NASA is Monitoring Sea Level Rise. (2021). Sustainability for All. https://www.nasa.gov/specials/sea-level-rise-2020/

End of M1U1 Sea Level Rise

Co-funded by the Erasmus+ Programme of the European Union

M1 U2 Water Temperature

Prepared by ITTI

Co-funded by the Erasmus+ Programme of the European Union

On completion of this module you will learn...

On successful completion of this resource, youth workers, youth trainers and youth leaders will be able to:	Knowledge	Skills	Attitudes
Water Temperature - origin and consequences	Explain the key concepts of water temperature; comprehend the linkages between climate changes and their impact on the environment	Develop systematic and critical thinking skills and encourage participants to question prevailing opinions	Create an awareness and understanding of the effects of climate change
Climate Change and Water Temperature – direct link	Acknowledge the connection between the water cycle and global warming	Advance systematic and critical thinking skills and encourage participants to question prevailing opinions	Build awareness and understanding of the flow of water in the environment and the effects of global temperature
Climate Change and Water Temperature – indirect link	Recognise the indirect connection between the water cycle and global warming	Establish systematic and critical thinking skills and encourage participants to question prevailing opinions;	Generate awareness and understanding of the flow of water in the environment and the effects of global temperature

Module Aim

This module is a tool that will help trainers to teach the following knowledge:

- Understand the key concepts of climate change; comprehend the linkages between climate changes and their impact on environment;
- Understand the connection between water cycle and global warming;
- Learn about the 17 sustainable development goals with focus on SDG 13- climate action and SDG 14- life below water;
- Explaining ocean warming: causes, scale, effects and consequences

General aim

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Learners will develop the following skills:

- Develop an awareness and understanding of the effects of climate change;
- Encourage active participation in order to promote sustainability, including at the personal, local or global scale;
- Develop young people's knowledge of environmental and social issues at local and global level;
- Strengthen values relevant to sustainability, for example: empathy, equality, solidarity, responsibility, concern for future generations, appreciation of nature

A brief introduction to the key concepts of climate change and the linkages between climate changes and their impact on environment

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Goddard TV Tape:G2009-090 -- Tides of Change: Remote Sensing and the Global Ocean
https://svs.gsfc.nasa.gov/10502

Key learning objectives of climate change

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1. What is climate change?
2. What impacts is climate change having around the world?
3. How are humans causing climate change?
4. What can we all do to stop climate change?
5. Which are the key concepts of climate change?
6. How to develop an awareness and understanding of the effects of climate change?

Source:
https://www.un.org/en/;
https://cleanet.org/index.html;
https://ypte.org.uk/

Climate change and the threats for the Oceans

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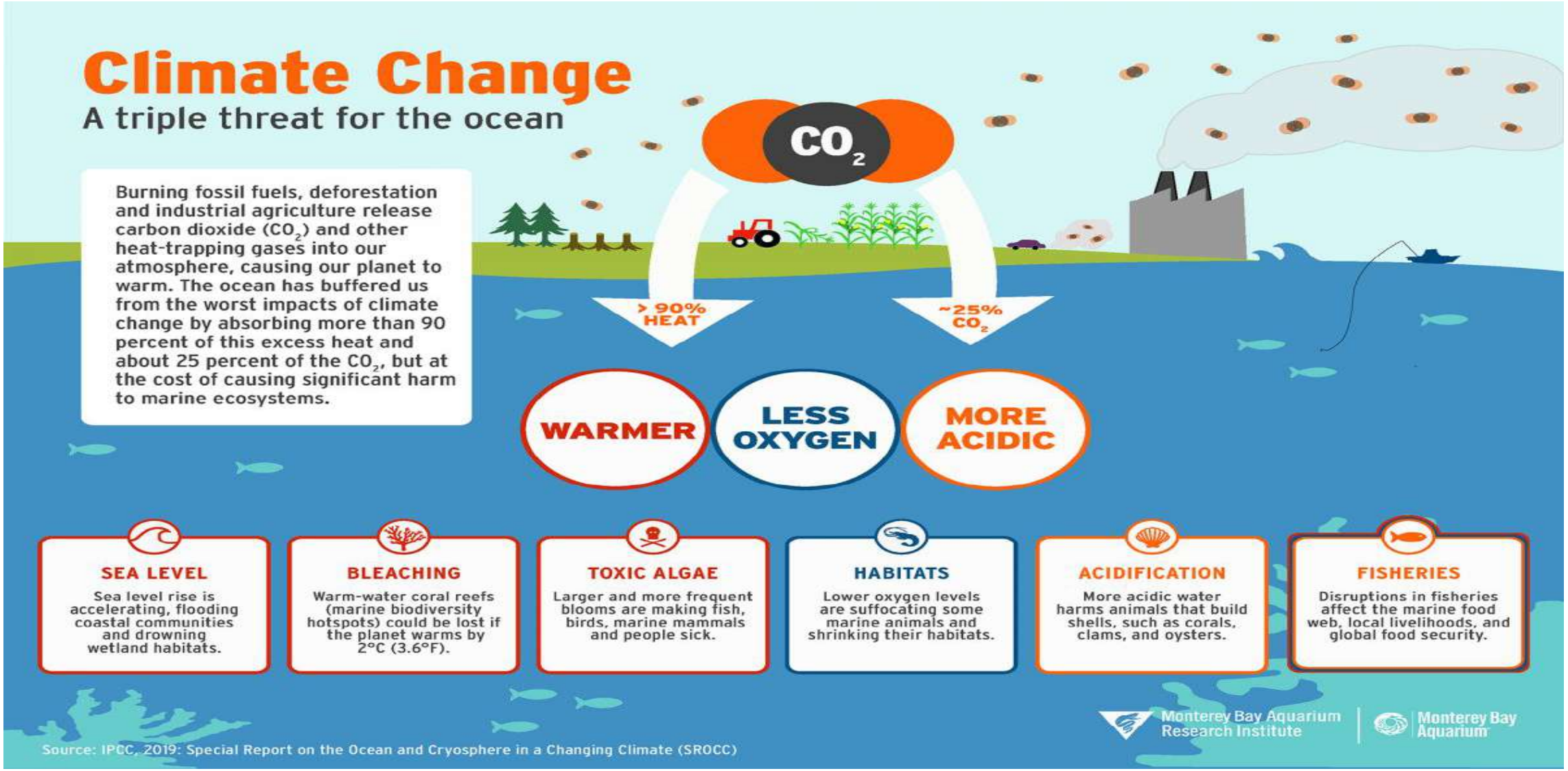

Climate change impacts in Europe's regions

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Climate change impacts in Europe's regions

Climate change is projected to impact the availability of water in Europe, putting additional pressure on southern regions already facing water stress. Other parts of Europe are expected to face more frequent flooding events, while low-lying regions are at risk from storm surges and sea level rise.

Mediterranean region
- Large increase in heat extremes
- Decrease in precipitation and river flow
- Increasing risk of droughts
- Increasing risk of biodiversity loss
- Increasing risk of forest fires
- Increased competition between different water users
- Increasing water demand for agriculture
- Decrease in crop yields
- Increasing risks for livestock production
- Increase in mortality from heat waves
- Expansion of habitats for southern disease vectors
- Decreasing potential for energy production
- Increase in energy demand for cooling
- Decrease in summer tourism and potential increase in other seasons
- Increase in multiple climatic hazards
- Most economic sectors negatively affected
- High vulnerability to spillover effects of climate change from outside Europe

Boreal region
- Increase in heavy precipitation events
- Decrease in snow, lake and river ice cover
- Increase in precipitation and river flows
- Increasing potential for forest growth and increasing risk of forest pests
- Increasing damage risk from winter storms
- Increase in crop yields
- Decrease in energy demand for heating
- Increase in hydropower potential
- Increase in summer tourism

Continental region
- Increase in heat extremes
- Decrease in summer precipitation
- Increasing risk of river floods
- Increasing risk of forest fires
- Decrease in economic value of forests
- Increase in energy demand for cooling

Atlantic region
- Increase in heavy precipitation events
- Increase in river flow
- Increasing risk of river and coastal flooding
- Increasing damage risk from winter storms
- Decrease in energy demand for heating
- Increase in multiple climatic hazards

Coastal zones and regional seas
- Sea level rise
- Increase in sea surface temperatures
- Increase in ocean acidity
- Northward migration of marine species
- Risks and some opportunities for fisheries
- Changes in phytoplankton communities
- Increasing number of marine dead zones
- Increasing risk of water-borne diseases

Arctic region
- Temperature rise much larger than global average
- Decrease in Arctic sea ice coverage
- Decrease in Greenland ice sheet
- Decrease in permafrost areas
- Increasing risk of biodiversity loss
- Some new opportunities for the exploitation of natural resources and for sea transportation
- Risks to the livelihoods of indigenous peoples

Mountain regions
- Temperature rise larger than European average
- Decrease in glacier extent and volume
- Upward shift of plant and animal species
- High risk of species extinctions
- Increasing risk of forest pests
- Increasing risk from rock falls and landslides
- Changes in hydropower potential
- Decrease in ski tourism

Source: EEA Report No 01/2017 — *Climate change, impacts and vulnerability in Europe 2016.*

Climate change impacts: how to build resilience

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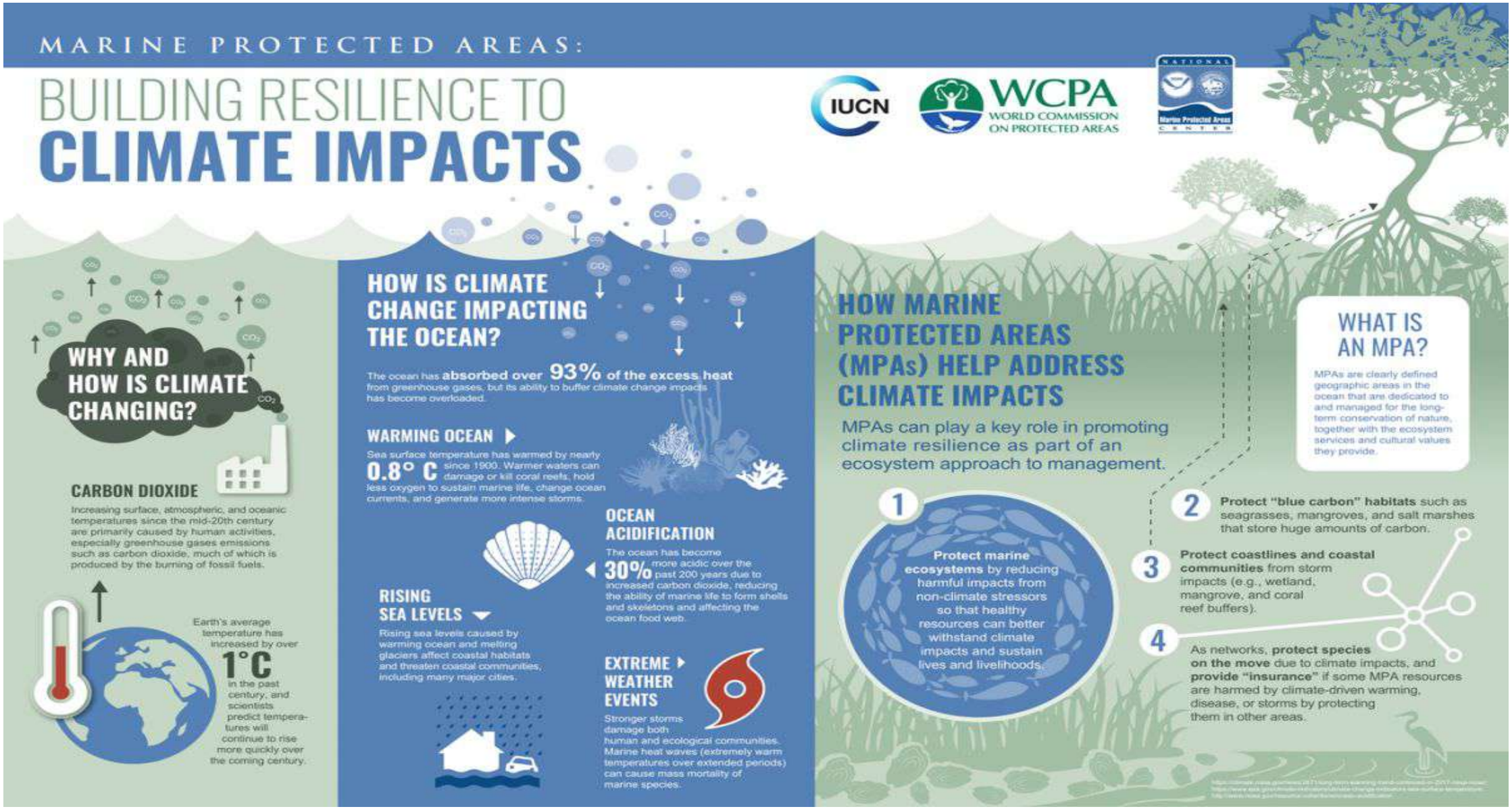

Water cycle and its connection with global warming

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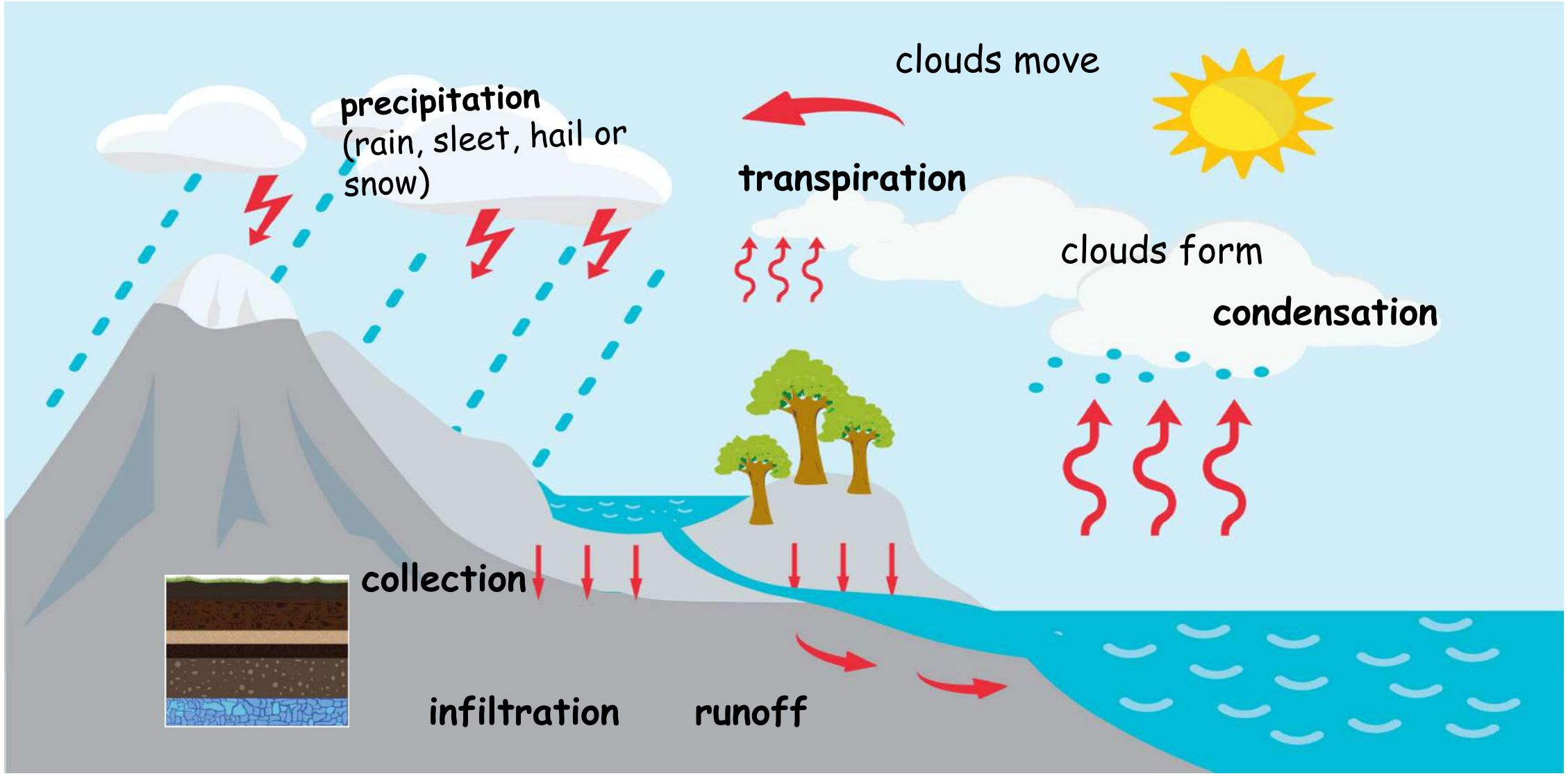

UN's 17 Sustainable Development Goals(SDGs)

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The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future.

The 17 Sustainable Development Goals (SDGs), recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

Sustainable Development Goal № 13- Climate change

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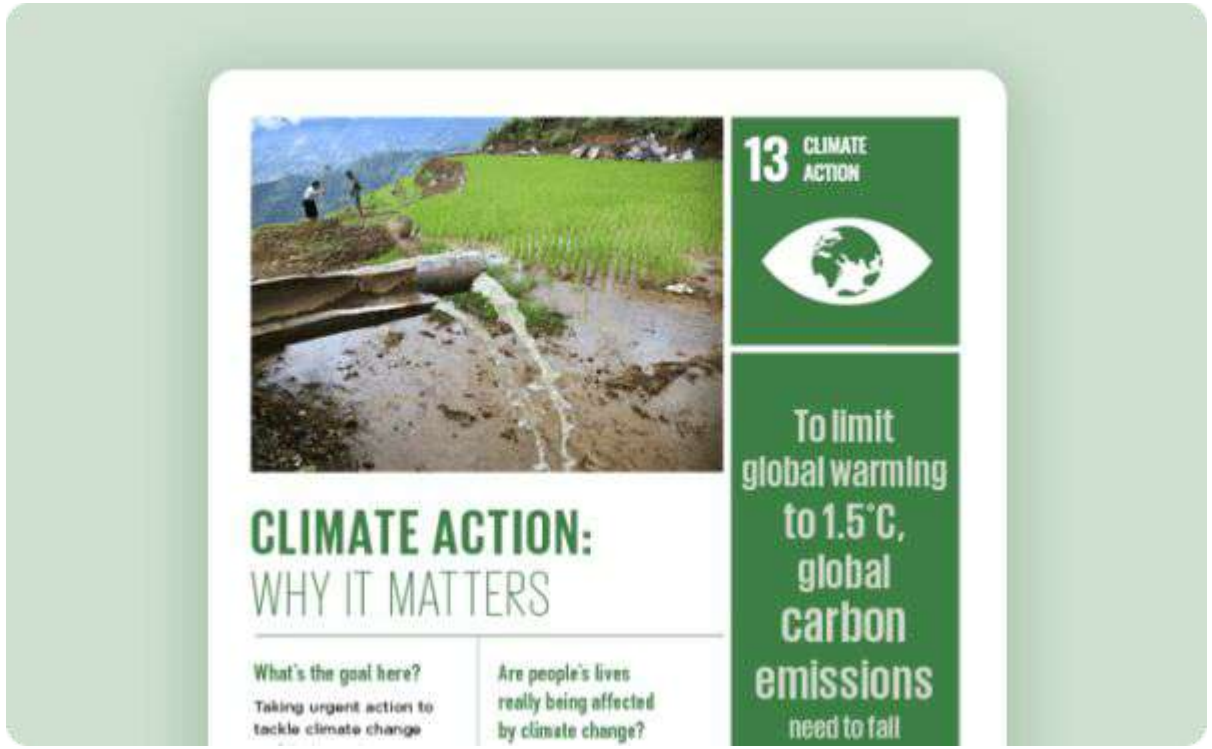

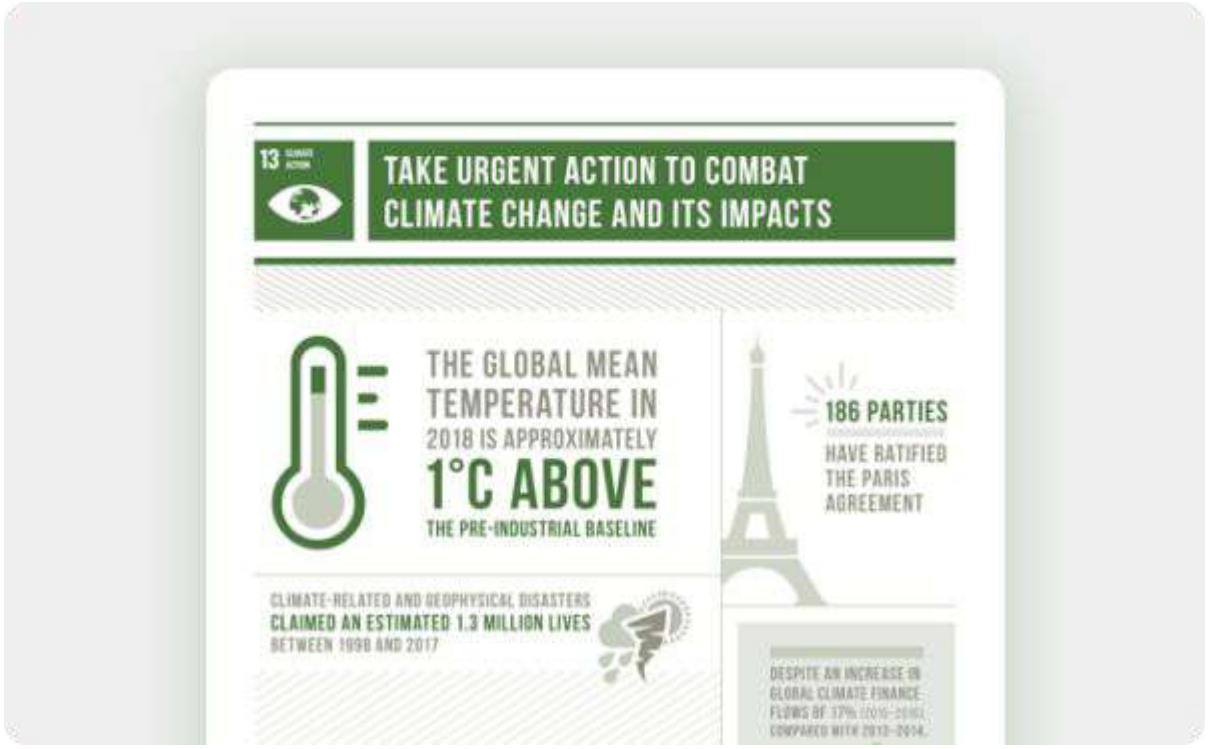

The Paris Agreement on climate change

The historic Paris Agreement provides an opportunity for countries to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. It entered into force on 4 November 2016.

©https://www.un.org/sustainabledevelopment/climate-change/

SDGoal № 13- Climate change: targets

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13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

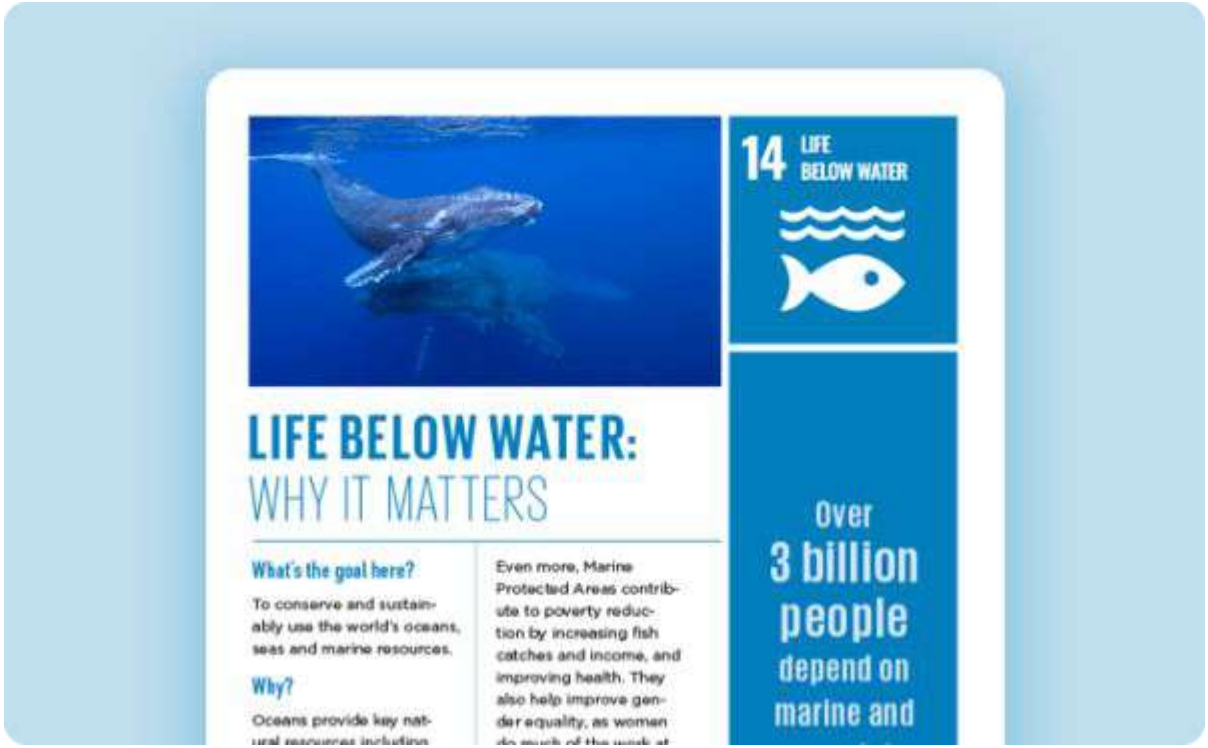
13.2 Integrate climate change measures into national policies, strategies and planning

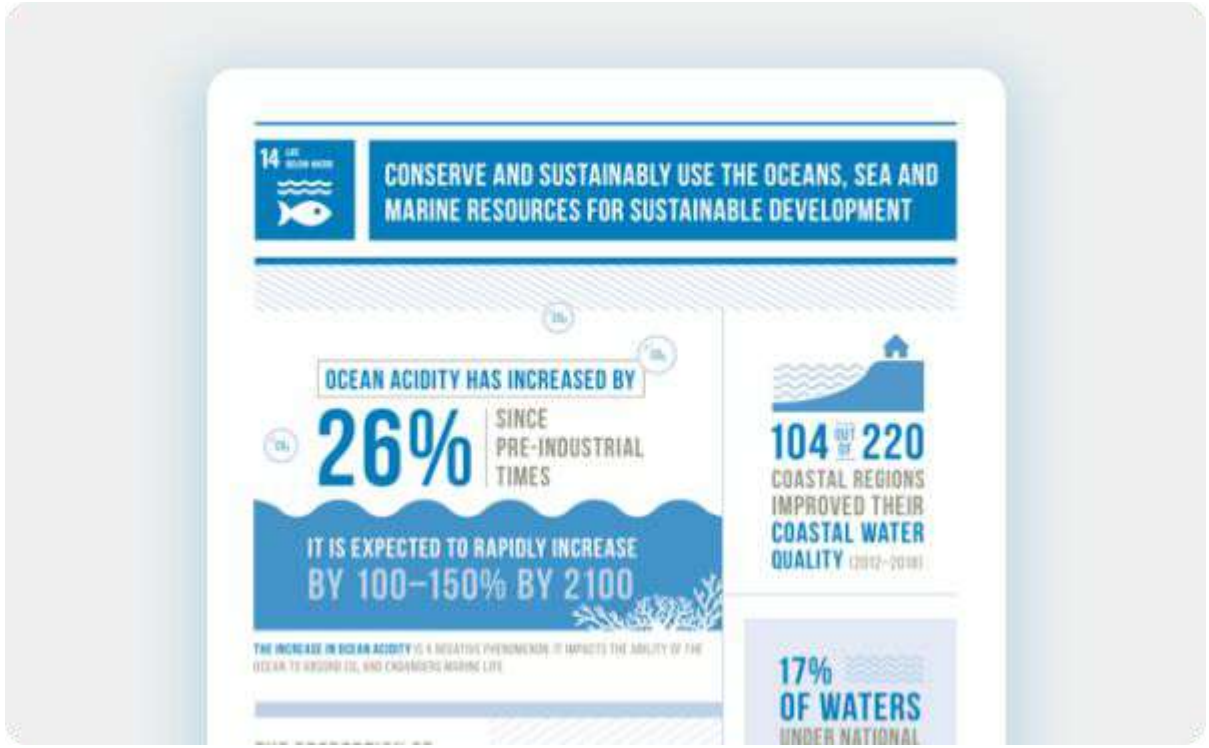
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

13.A Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible

13.B Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

Sustainable Development Goal № 14- Life below water





Oceans cover three quarters of the Earth's surface, contain 97 per cent of the Earth's water, and represent 99 per cent of the living space on the planet by volume.

Climate change

Oceans absorb about 30 per cent of carbon dioxide produced by humans, buffering the impacts of global warming.

- Carbon emissions from human activities are causing ocean warming, acidification and oxygen loss.
- The ocean has also absorbed more than 90 per cent of the excess heat in the climate system.
- Ocean heat is at record levels, causing widespread marine heatwaves.

https://www.un.org/sustainabledevelopment/oceans/

CLIMATE CRISES AND OCEAN WARMING

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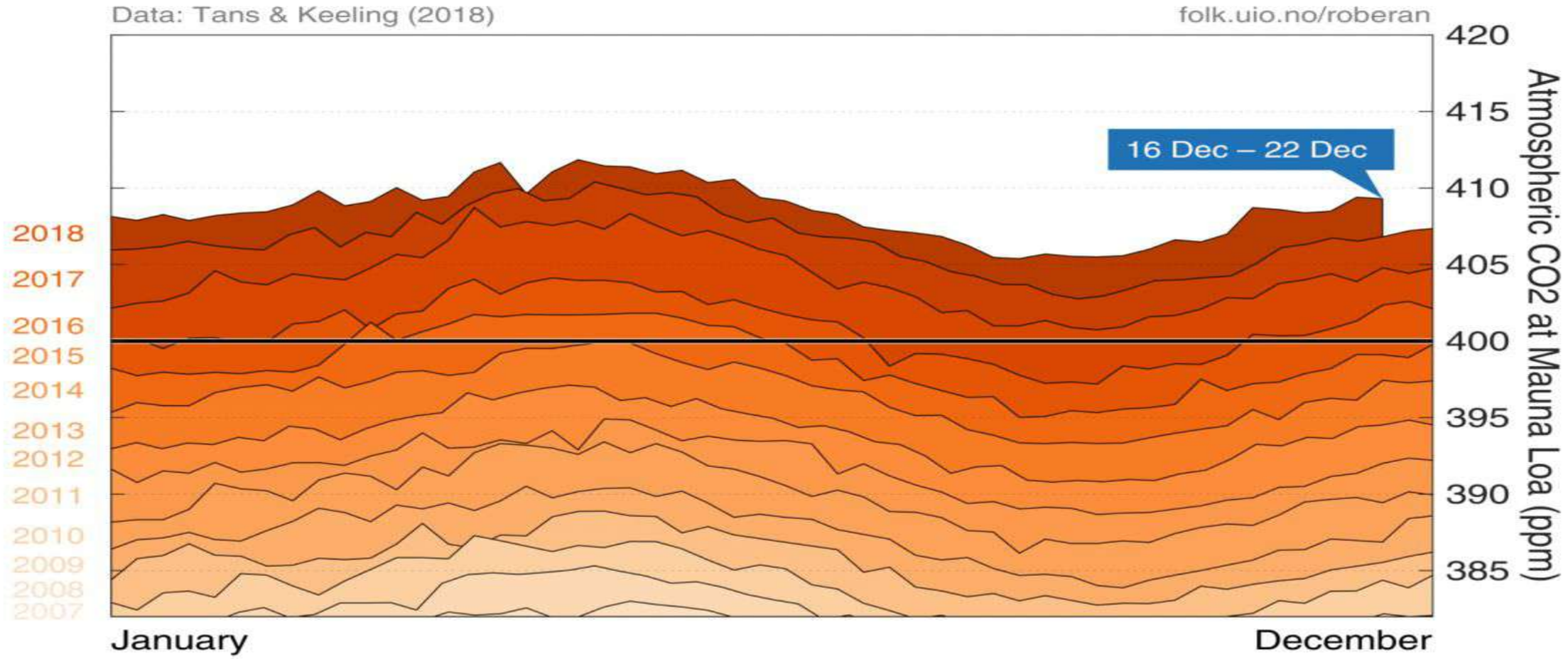
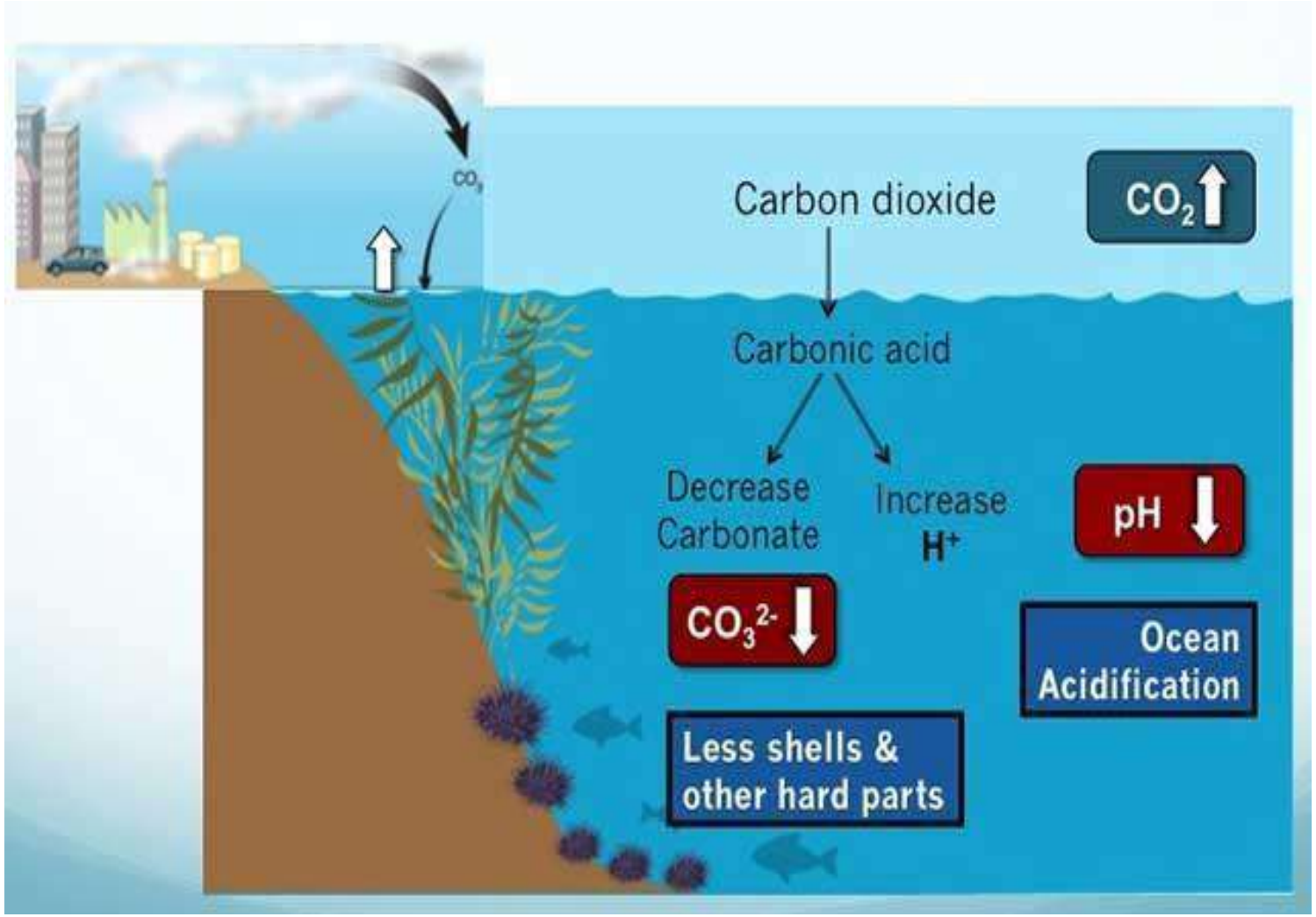


Using Climate Stripes one can see how much your region has warmed between 1906 and 2018.

NOAA (http://marinesciencetoday.com/2014/03/12/ocean-acidification-the-devastating-truth/)

CLIMATE CRISES AND OCEAN WARMING



In addition, the ocean also absorbs 25% of the atmosphere's carbon dioxide. As the carbon dioxide in the atmosphere increases and the ocean absorbs it, the ocean's chemistry changes, becoming more acidic. This ocean acidification has impacts on sea creatures. Scientists have been investigating the potential effects over the last 25 years. Many shell-building animals are already showing signs of this stress.

NOAA (http://marinesciencetoday.com/2014/03/12/ocean-acidification-the-devastating-truth/)

OCEAN WARMING

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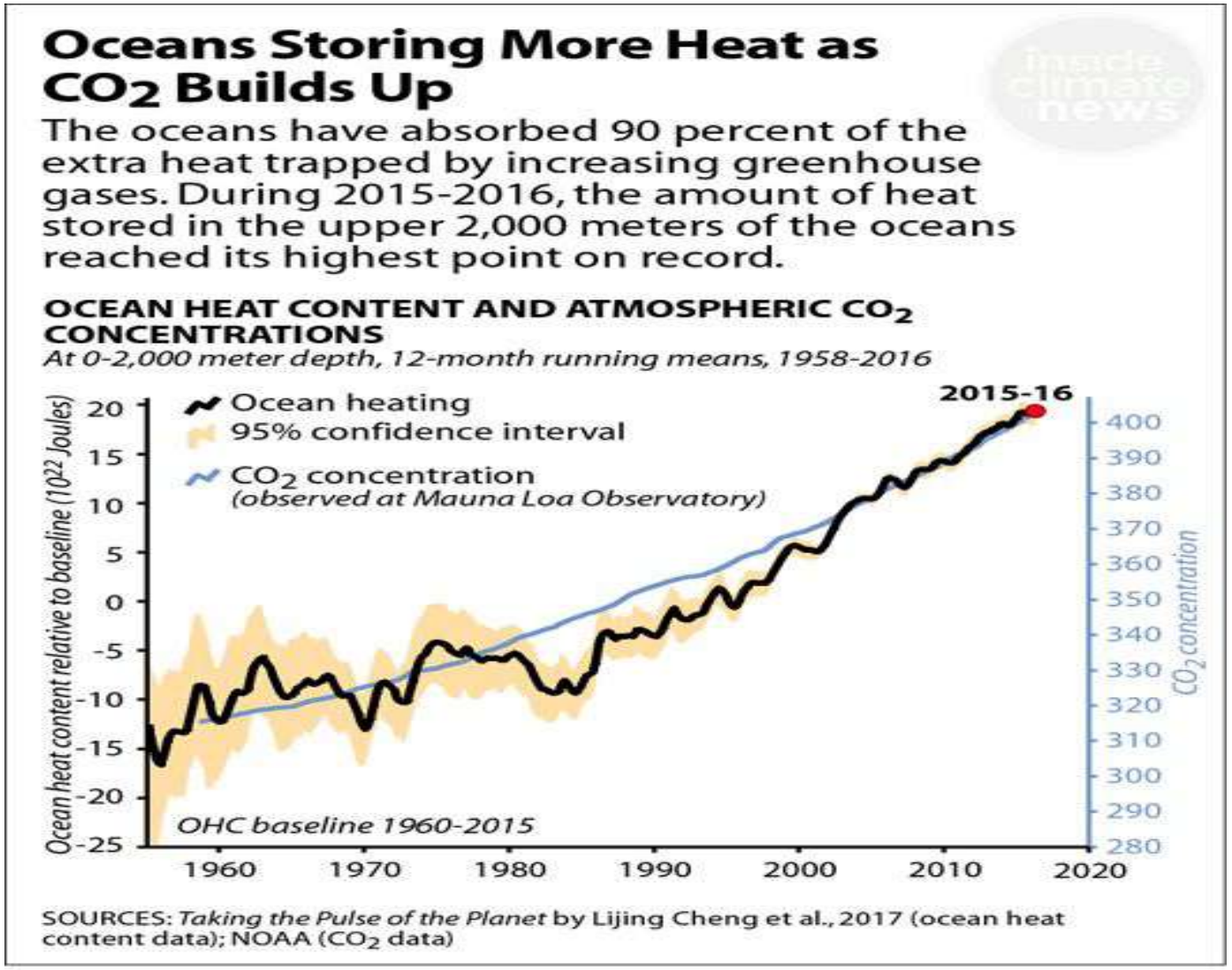


We call it a climate crisis now; earlier in our understanding we called what the earth is experiencing “global warming.” It could also be called “ocean warming” since the oceans have absorbed more than 90% of that warming, as this graph shows.

The oceans are holding more and more heat; they are heating up faster than scientists had predicted.

Scientists have been tracking ocean warming around the globe. Where, how much, how quickly did the ocean warm, and how much heat will it absorb in the future, “are questions that send satellites orbiting around the globe and take oceanographers to the far reaches of the sea. Measuring the magnitude and rate of ocean heat uptake is a very complex and challenging task that requires enormous observational and modeling effort.”

https://www.shapeoflife.org/resources/climate-change

OCEAN WARMING

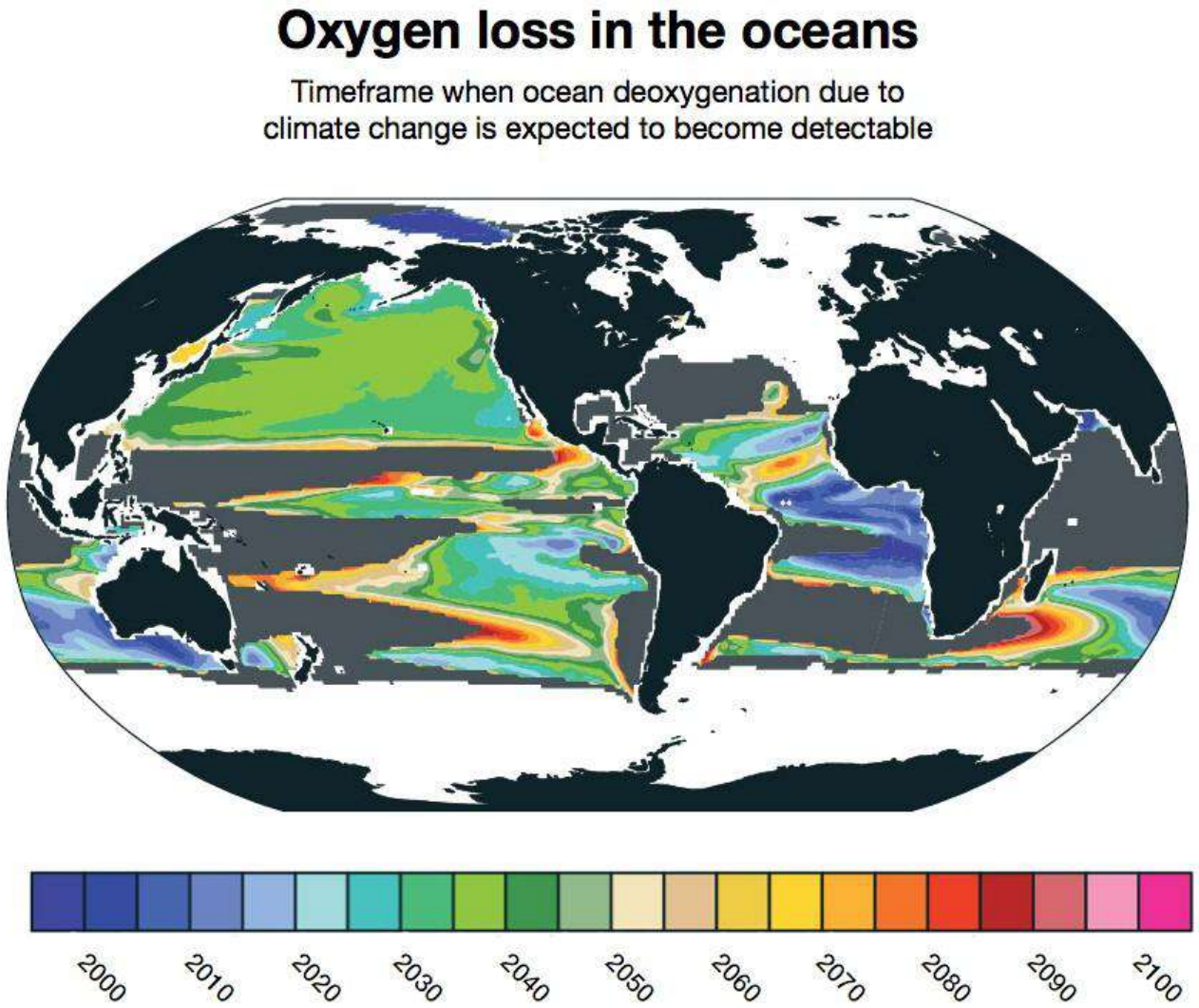
ttps://www.nationalgeographic.com/science/article/coral-reef-bleaching-global-warming-unesco-sites

Coral bleaching is caused by higher ocean temperatures, which starve the coral reefs of their main food source, microscopic algae. When the ocean is too warm for the symbiotic algae that live in coral tissues, they leave the corals or die – a process called bleaching. The frequency of coral bleaching is increasing. In the past, coral reefs bleached every 25 to 30 years. Since 2010, that timeframe has shrunk to six years. By early 2018, the Great Barrier Reef alone has bleached four times since 1998.

Some coral reefs can recover if there's enough time between bleaching events. But if corals can't adapt quickly enough, "we could be looking at the effective loss of most of the world's coral reefs," said Mark Eakin, an oceanographer who is coordinator of the Coral Reef Watch project at the United States National Oceanographic and Atmospheric Administration that looks at loss of world's coral reefs.

https://www.shapeoflife.org/resources/climate-change

OCEAN WARMING



The decline in oxygen is already happening in some places and will get worse over the coming decades. A scientific report in December 2019 found that oxygen levels in the world's oceans declined by roughly 2 percent between 1960 and 2010.

As oceans heat up, they hold less oxygen than cooler water. In the open ocean, global warming is the main cause of declining oxygen. Direct measurements show the amount of oxygen in the global oceans has decreased by around 2% over the past 50 years. Oxygen is fundamental to biological processes in the ocean. Its decline can cause changes in biodiversity, productivity and nutrient cycling.

https://www.shapeoflife.org/resources/climate-change

OCEAN WARMING

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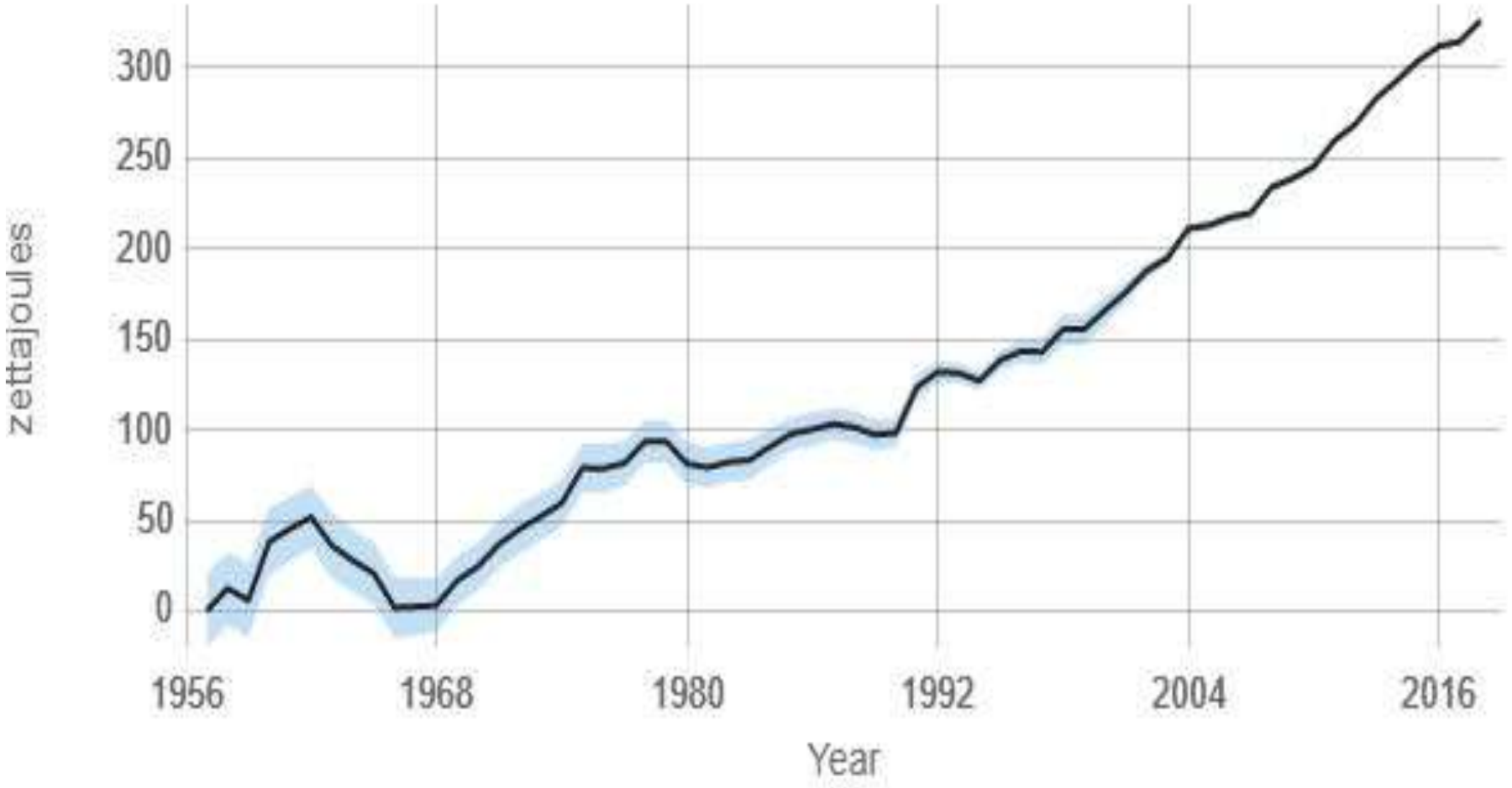
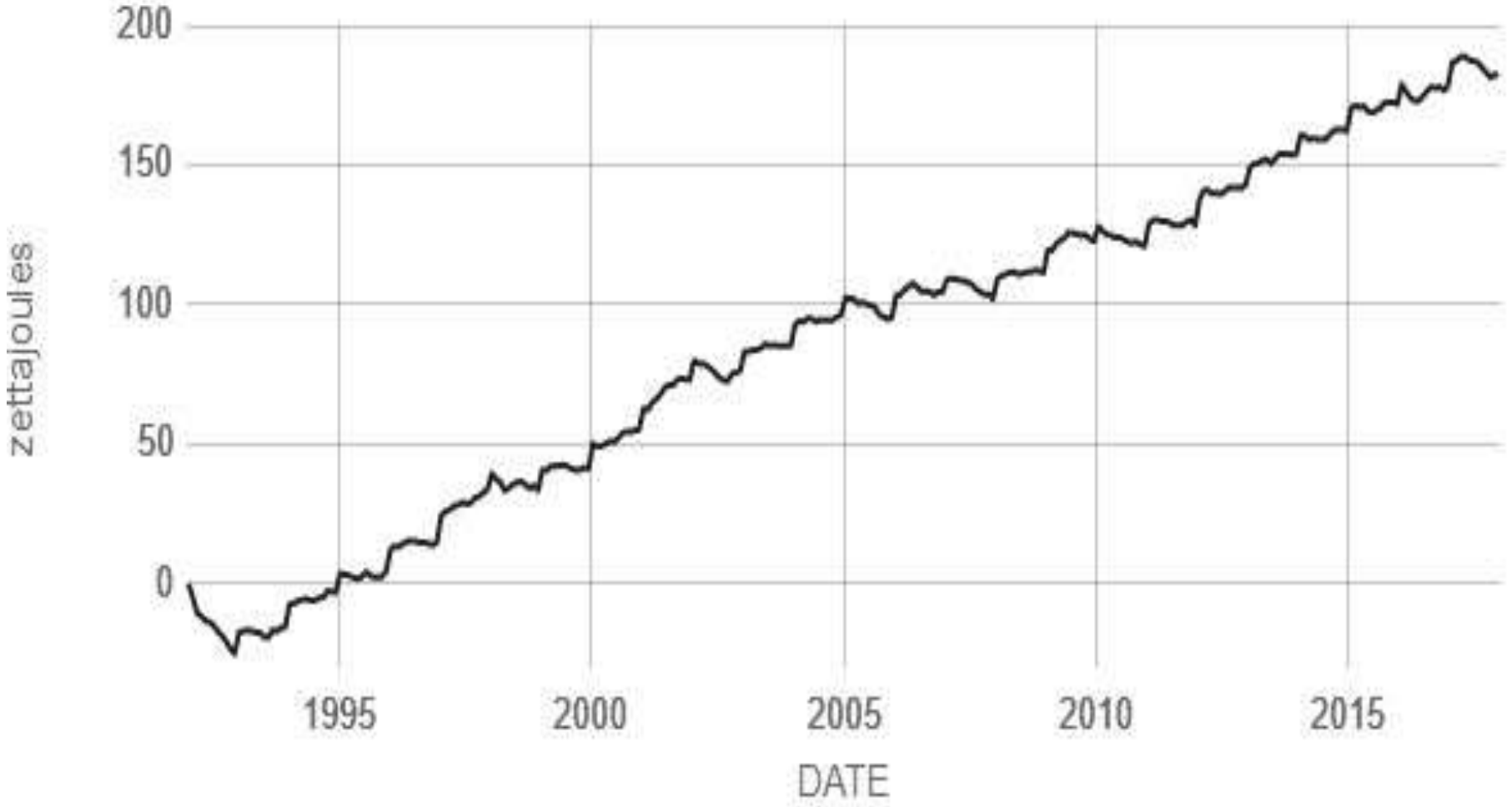


Source: climate.nasa.gov

OCEAN HEAT CONTENT CHANGES SINCE 1955 (NOAA)

Data source: Observations from various ocean measurement devices, including conductivity-temperature-depth instruments (CTDs), Argo profiling floats, and eXpendable BathyThermographs (XBTs).

OCEAN WARMING



Source: climate.nasa.gov

OCEAN HEAT CONTENT CHANGES SINCE 1992 (NASA)

Data source: Observations from satellites and various ocean measurement devices, including conductivity-temperature -depth instruments (CTDs), Argo profiling floats, eXpendable BathyThermographs (XBTs), instrumented mooring arrays, and ice-tethered profilers (ITPs).

OCEAN WARMING/ACIDIFICATION

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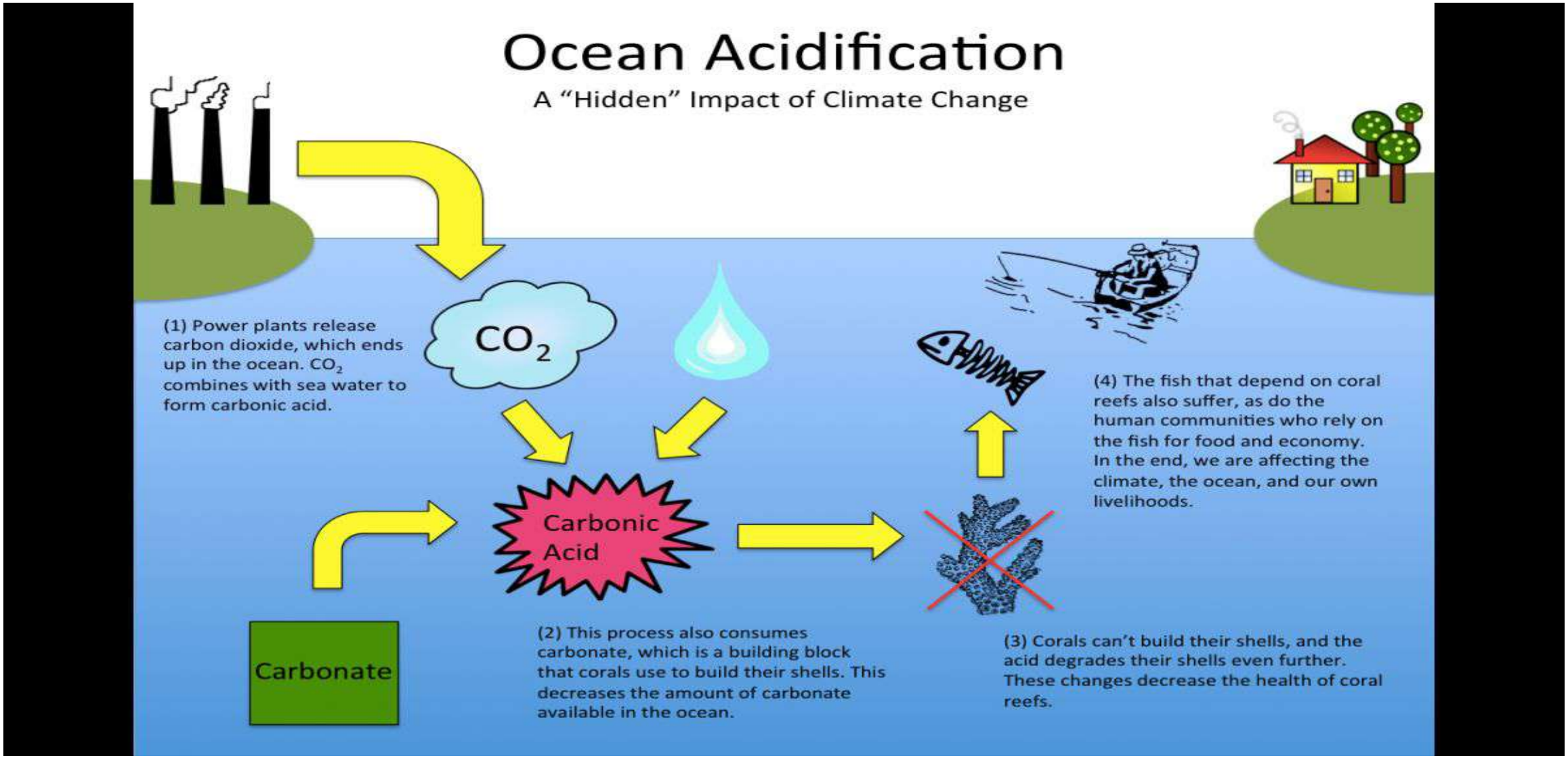


OCEAN WARMING/ACIDIFICATION

The increasing amount of carbon dioxide dissolved in oceans is leading to more acidic seawater that is harmful to many kinds of marine life. Sometimes called climate change's "evil twin," ocean acidification poses a critical threat to shell building organisms: they make thinner shells and the shells of some species are actually dissolving.

Some animals that use calcium carbonate to build shells and skeletons face challenges. Pteropods, free-swimming sea snails called sea butterflies, are often the primary zooplankton at the base the food web in arctic and subarctic waters. These animals may be unable to maintain shells in waters with less available calcium carbonate. Scientists are already seeing pteropods with damaged shells.

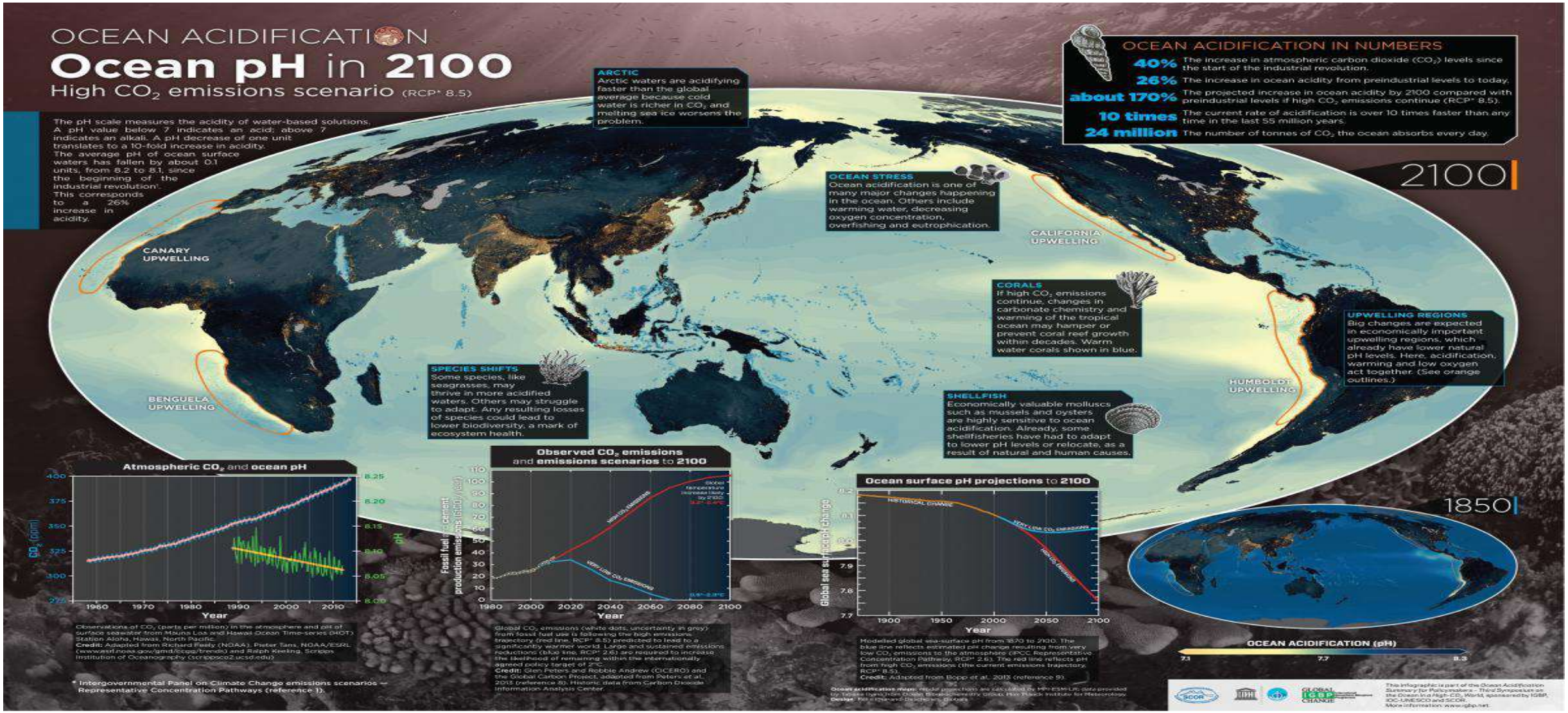
This is also true for coral reefs, which are made of calcium carbonate skeletons. To make their skeletons, corals need two ingredients: calcium ions and carbonate ions. Acids react with carbonate ions, in effect making them unavailable.

As the ocean absorbs more carbon dioxide, carbonate ions become scarcer. Corals have to expend more energy to collect them, reducing their ability to build their skeletons. Stanford University scientists have produced a 360-degree virtual underwater ecosystem "to provide an up-close look at how coral reefs might appear by the end of the century if emissions aren't curbed."

Marine arthropods also make their shells from calcium carbonate. Crabs, for example, are vulnerable to the changes in ocean chemistry. This toolkit contains information and images about how ocean acidification is impacting Dungeness crab.

OCEAN WARMING/ACIDIFICATION

ACT NOW



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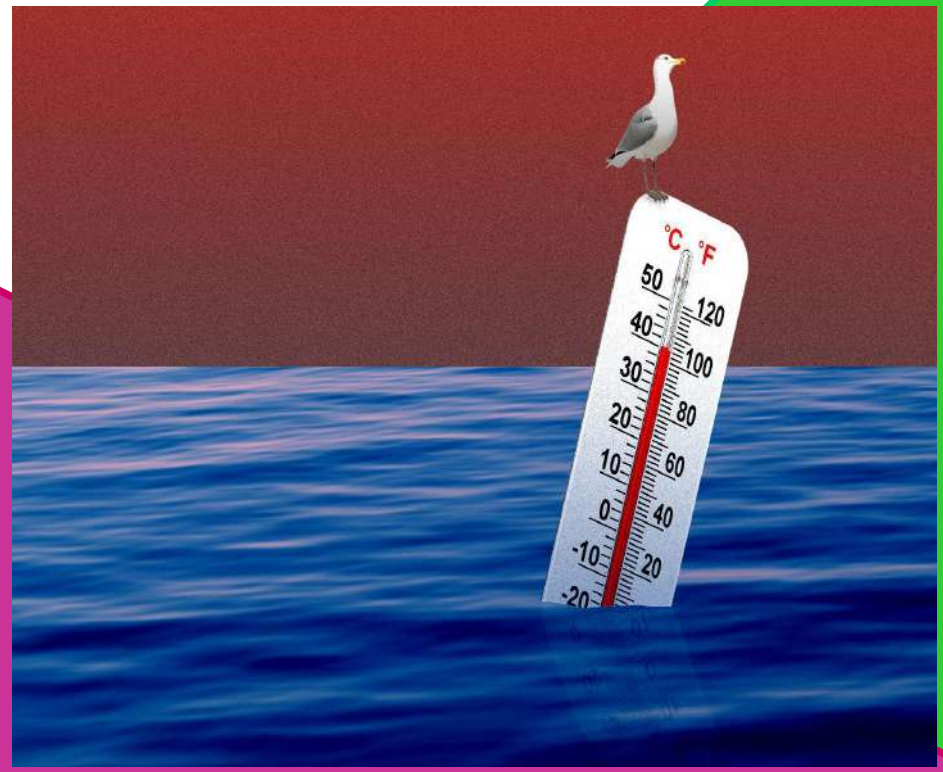
End of M1U2 Water Temperature

ACT NOW



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of the European Union

Module Aim

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This module is a tool that will help trainers to teach the following knowledge:

- Comprehend the linkages between climate changes and migration.
- Comprehend and distinguish the different definitions linked to climate changes and migration.
- Learn agricultural production and processes' impacts on the environment.
- Understand climate change impact in the future of agricultural production.

Learners will develop the following skills:

- Identify main drivers of migration and climate change in specific contexts
- Analyse how climate change can impact migration pathways and what approaches will help to address climate-induced displacements.
- Recognise GHG volume of emissions in different agricultural productions and sectors
- Identify new agricultural techniques and their food security implications

ACT NOW

M2 U1 Climate Change Immigrants

Prepared by PROGEU

Co-funded by the Erasmus+ Programme of the European Union

On completion of this module you will...

On successful completion of this resource, youth workers, youth trainers and youth leaders will be able to:	Knowledge	Skills	Attitudes
Climate Change Immigrants – origin and consequences	Discern the linkages between climate changes and migration.	Identify the main drivers of migration and climate change in specific contexts.	Develop care and concern for the environment and respect for the rights of other people.
Climate Change and Immigration – Direct Link	Comprehend and distinguish the different definitions linked to climate changes and migration.	Analyse how climate change can impact migration pathways and what approaches will help to address climate-induced displacements.	Be open to supporting young people to enhance their knowledge and tools on the issue.
Climate Change and Immigration – Indirect Link	Discuss the concept of climate change and the indirect link with immigration.	Receive specific steps and tools to demonstrate the link.	Awareness on how to support young people in the delivery of this topic.

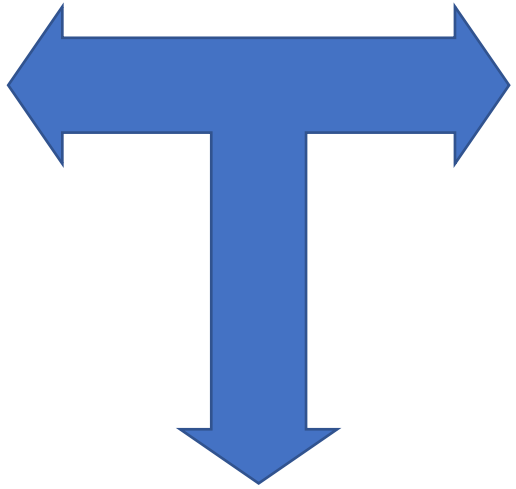
A brief Introduction

©Adelphi, Berlin. (2018, January 9). *Links between climate change and migration* [Video]. YouTube https://www.youtube.com/watch?v=VQslOVboFfU

Definitions on Human Mobility

Displacement "A forced removal of a person from his or her home or country, often due to armed conflict or natural disasters".

Internal migration "A movement of people from one area of a country to another area of the same country for the purpose or with the effect of establishing a new residence. This type of migration may be temporary or permanent."



International migration "An international migrant is […] any person who changes his or her country of usual residence"
Long-term migrant: "A person who moves to a different country for a period of at least a year (12 months)
Short-term migrant: "A person who moves to a different country for a period of at least 3 months but less than a year

Cross-border migration "A process of movement of persons across international borders"

Environmental terminology relevant to mobility

Environmental migrants are defined as "*persons or groups of persons who, predominantly for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move within their country or abroad*".

Environmentally displaced person refers to "*persons who are displaced within their country of habitual residence or who have crossed an international border and for whom environmental degradation, deterioration or destruction is a major cause of their displacement, although not necessarily the sole one".*

N.B. The term "**climate refugees**", often used in relation to forced migration in the context of climate and environmental change, is not a legally valid term as the 1951 Refugee Convention does not recognize environmental factors as criteria to define a refugee. This term is often substituted by the term **environmentally displaced person**, considered as a less controversial alternative.

How natural resources misuse affects migration - Land

ACT NOW

Land grabbing

Case study Senhuile – Senethanol

In 2010, Senethanol SA, a company set up in Dakar by Senegalese and foreign investors, signed a lease for 20,000 hectares of land for the production of biofuels. The project covered part of the territory of a nature reserve in northern Senegal. The land acquisition process was characterised by lack of information and consultations with locals and a strong power asymettry

Reserve of Ndiael, Senegal, Google Maps

Definition

The International Land Coalition defined *land grabbing* at the **International Conference in Tirana in 2011** as "*land acquisition that is in violation of human rights, that takes place without a transparent and democratic decision-making process, without prior consent of the pre-existing land users and without consideration of environmental impacts*".

Causes

- Soaring prices and growing distrust on world markets
- Increased production of biofuels
- The pursuit of profits through large-scale speculative financial movements

Effects

- Land expropriations
- Large migration flows, both internal and international
- Violation of human rights
- Pollution

How natural resources misuse affects migration - Water

ACT NOW

Background

The growing demand for water resources has stimulated policies to increase supply. Water stress turns into ecological stress as pressure on the water cycle turns into pressure on the entire earth system. Water and ecological stress, by decreasing the availability of the resource, in terms of quantity and quality, and producing ecological imbalance, can cause or exacerbate social tensions, conflicts for its control and migratory flows in some cases. The conflicts can be urban, regional, international or internal, within the same country, and cross-border, between neighbouring states. The reasons for conflicts can be distinguished into geopolitical, economic and ecological, although the lines of demarcation are often blurred and several motivations can coexist at the same time.

Challenges and opportunities

Cooperation is essential, especially in areas vulnerable to the impacts of climate change and where water is already scarce. Overexploitation of water resources. he way in which transboundary waters are managed affects sustainable development within and beyond a country's borders. Therefore, the various heavily water-dependent sectors – agriculture, industry, energy, navigation and water supply and sanitation – need to cooperate on a supranational level. For example, efficient, cooperative management and development of shared waters and adjacent flood plains can boost food and energy production, helping to reduce poverty and migration.

Transboundary basins

Case study – Arab-Israelian conflict

From the 1950s onwards, Israel, Syria and Jordan began to unilaterally implement a series of water projects in order to develop and sustain their economies. The management of the basin's resources then became a further front of confrontation between these countries, forcing people to move within their State or to neighbour one

© http://www.un.org/Depts/Cartographic/map/profile/israel.pdf

EU role in addressing climate and environmental migration

The EU and its MSs take an active role in promoting environmental protection in global fora. The EU started late but has increasingly been addressing the nexus of environmental change and migration over the last decade.
To date, **most European countries have made no efforts to extend national protection statuses to those displaced due to environmental factors**. Exceptions are **Italy, Sweden and Finland**, which developed national protection grounds for victims of climate change and natural disasters. However, Finland and Sweden suspended their respective national provisions as a consequence of high numbers of arrivals in 2015/2016.

The EU –with some exceptions – has remained quite silent on the issue of environmental migration and displacement. In the **external dimension**, the EU mentions climate change and disasters as potential root causes for migration, but hardly offers any concrete actions. In the **internal dimension**, the European Commission did not further build on its 2014 staff working paper. The European Parliament emphasised at times the links between climate change and disasters and migration and the need for addressing the identified legal gaps at EU level. At the MS level, with the exception of a few countries, **environmental reasons are not addressed in laws related to international protection or legal migration**. With hardly any cases based on environmental change and disaster related reasons for fleeing the home country, EU MSs currently see little need to address these phenomena in national laws. Additionally, European and national courts have not yet had to decide upon a claim by a victim of climate change or natural disaster.

ACT NOW

M2 U2 Agriculture Production

Prepared by ACCION LABORAL

Co-funded by the Erasmus+ Programme of the European Union

On completion of this module you will...

On successful completion of this resource, youth workers, youth trainers and youth leaders will be able to:	Knowledge	Skills	Attitudes
Climate change and impacts on human on Agriculture production – origin and consequences.	Discuss agricultural production and processes' impacts on the environment.	Recognise GHG volume of emissions in different agricultural productions and sectors.	Establish self-awareness about the fact that our consumption volume of a certain food directly affects climate change.
Climate change and agricultural production – direct link.	Recognise climate change impact on the future of agricultural production and the direct link.	Determine new agricultural techniques and their food security implications.	Present self-awareness about the need of including smart and eco techniques, turning agriculture into a more sustainable activity.
Climate change and agricultural production – indirect link.	Discern climate change impact on the future of agricultural production and the direct link.	Relate new agricultural techniques and their food security implications.	Demonstrate awareness on how to include smart and eco techniques into a more sustainable activity.

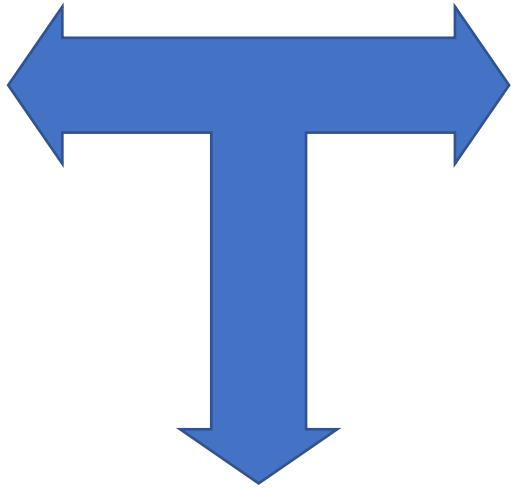
A Brief Introduction

©FAO: http://www.fao.org (2015, June 8). *Understanding Climate-Smart Agriculture* [Video]. YouTube https://www.youtube.com/watch?v=lUdNMsVDIZ0

Definitions on Agriculture production

Industrialization of agriculture “Massive and intensive production system of food quantities in less space and time, ecological imbalance and with great commercial benefits.”.

GHG “Greenhouse Gas is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapor (H2O), carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and ozone (O3)”



Sustainable agriculture

- must ensure global food security
- support sustainable and efficient management of land, water and natural resources.
- meet the needs of present and future generations for its products and services.
- improve the environmental protection and resilience of systems

Smart Farming “a sustainable methodology, designed to manage natural resources efficiently and to reduce the impact of this activity on the environment.

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Agricultural Industrialization and Climate Change

Agriculture emits 14% of global greenhouse gas (GHG) emissions, a volume similar to that caused by the transport sector.

This 14%, however, does not include the so-called indirect emissions from agriculture, such as the energy used in the manufacture of fertilizers, nor in the production and use of agricultural machinery, nor in the transport (of inputs and crops), which are included in the sections of industry, energy and transport.

If we take into account the energy used in agriculture and changes in land use to increase the agricultural area, these emissions can exceed 30% of the total.

Source: IPCC

Agriculture and Climate Change

ACT NOW

GHG emissions (excluding CO2)

The most important emissions from agriculture are those of nitrous oxide (N2O), produced in soils from synthetic nitrogen fertilizers and / or organic fertilizers (38%).

They are followed by methane (CH4) generated in the digestive process of ruminants (32%) and in the decomposition of organic matter in flooded rice fields (12%).

The burning of biomass (forests and scrub, stubble, sugar cane fields ...) emits methane and nitrogen oxides in significant quantities (11%).

Livestock manure and slurry also emit significant amounts of CH4 and N2O (7%).

Source: IPCC

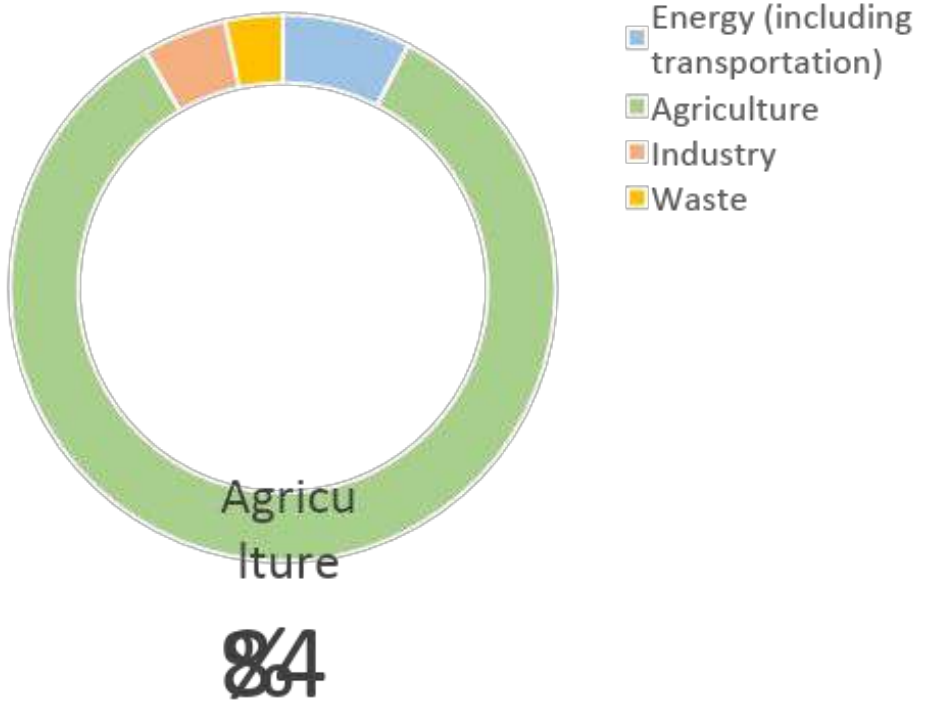
Agriculture and Climate Change

ACT NOW

N2O emissions by people

Sector	N2O (MtCO2eq)
Energy (including transportation)	237
Agriculture	2.616
Industry	155
Waste	106
Global	3.114

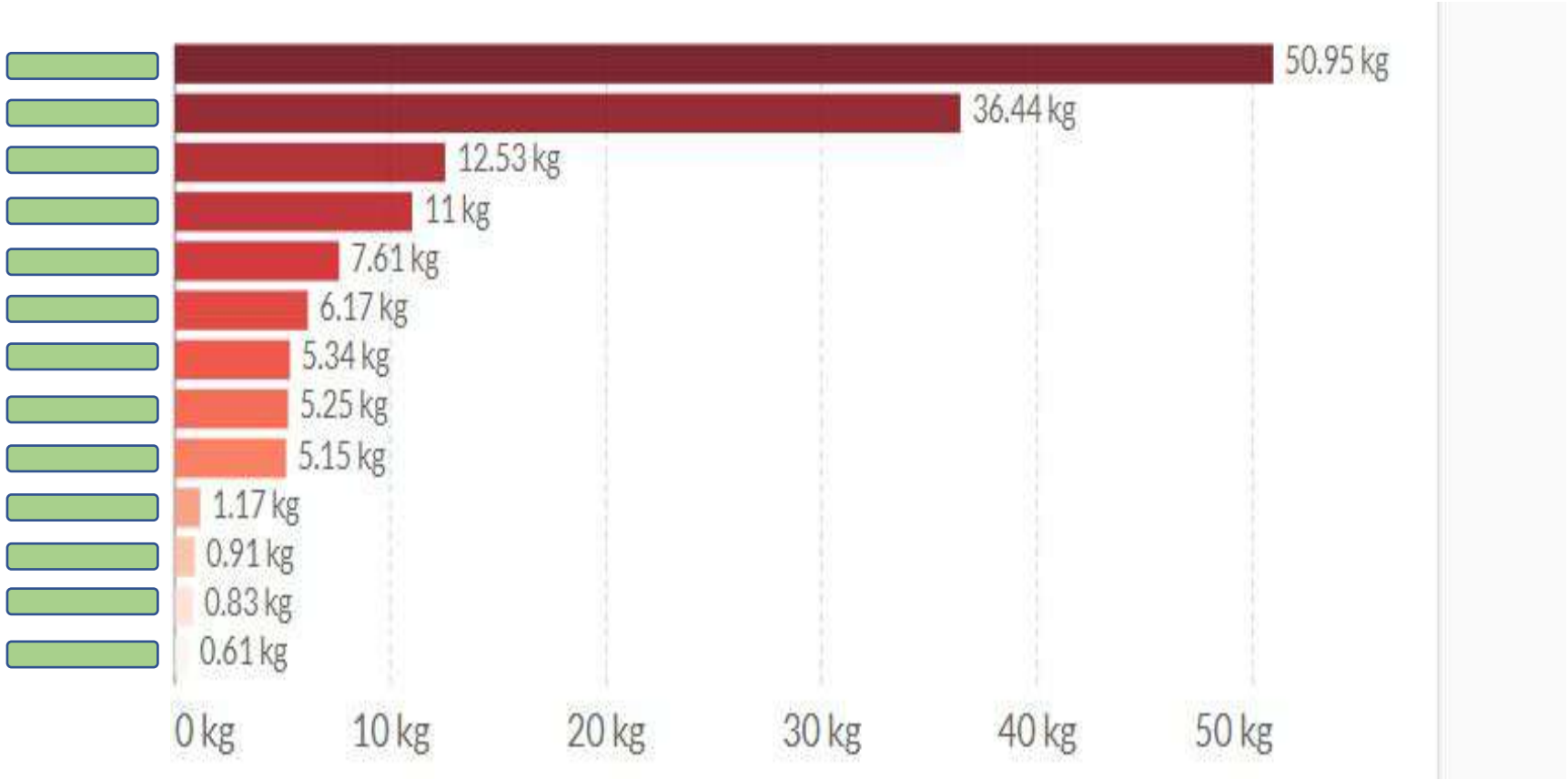
Source: US EPA. Global Anthropogenic Non-CO2 GHG Emissions: 1990-2020



N2O is the third most important greenhouse gas, with a global warming potential about 300 times higher than CO2 and a life of 120 years, representing about 8% of total greenhouse gas emissions

Exercise

Classify the products according to the amount of GHG emitted by their production.



Cane Sugar

Coffee

Tofu (soybeans

Milk

Beef (beef herd)

Olive Oil

Palm Oil

Pig Meat

Tomatoes

Lamb & Mutton

Poultry Meat

Cheese

Fish (farmed)

Climate Change's impact on Agriculture

Climate change is also affecting agriculture and its **production patterns**

Length of the growing season

Climate change has already altered the length of the growing season in some parts of the European continent.

The flowering and harvesting times for cereals are usually several days earlier, although this will vary from region to region.

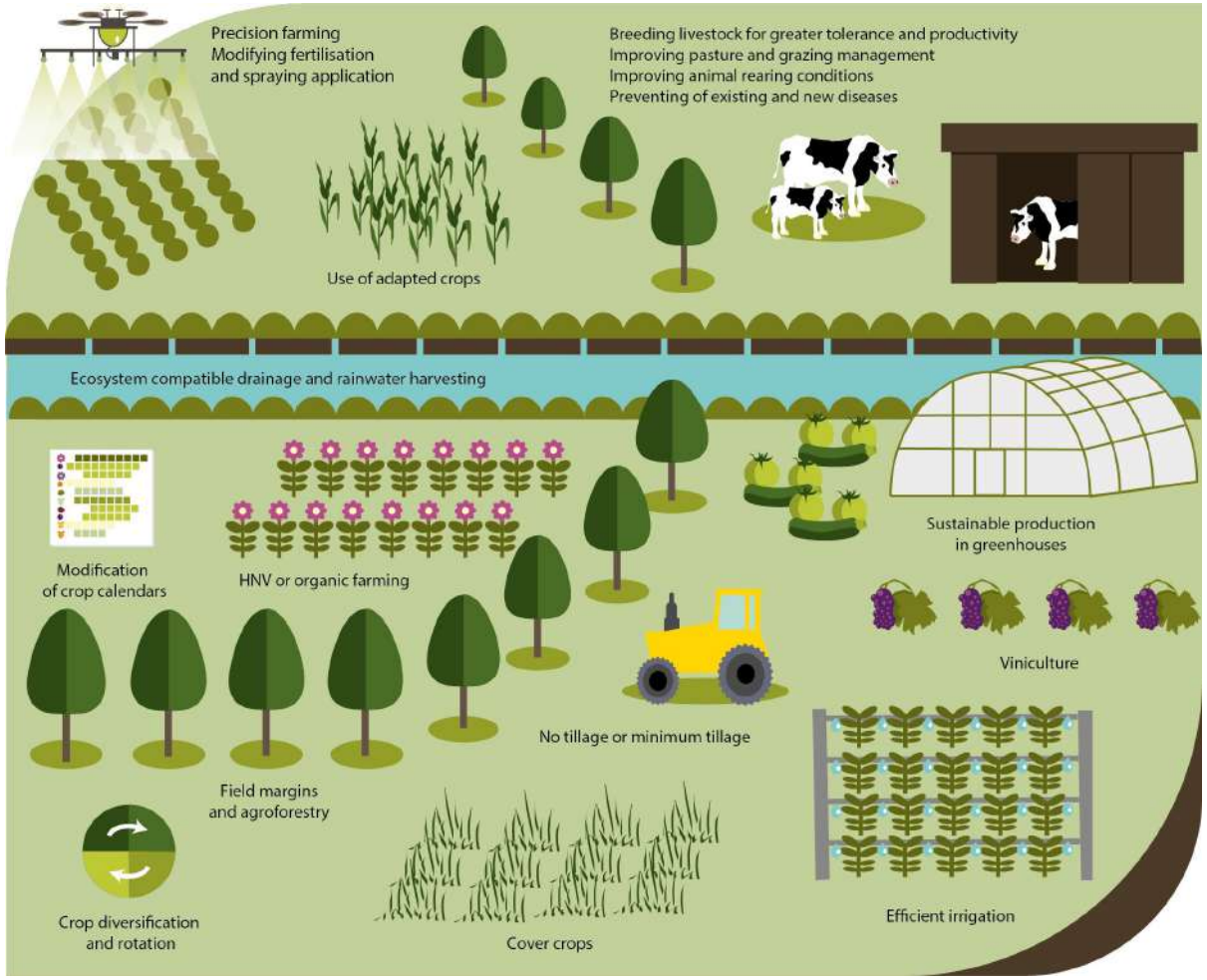
Productivity

With the increase in average temperature, agricultural productivity is also being affected in some areas.

- Southern areas: production has been limited due to extreme heat waves and reduced rainfall.
- Harvests in northern Europe could be multiplied by frost-free periods.
- In some areas of the Mediterranean, water and heat stress in the summer months could force some production to be shifted to winter.

Climate Change's impact on Agriculture

It is necessary to **include improvements** in the production system



Annual crop yields are unpredictable as a result of extreme weather events, as well as the proliferation of some invasive species such as insects or weeds and other diseases.

It is of vital importance to introduce agricultural solutions based on precision farming, which promote good practice in relation to the environment, including the use of organic manures and fertilisers, among other actions.

- Ecological fertilisers
- Drones
- Digital sensors and meters
- Precision digital tools
- Crop rotation
- Predictive tools

Environmental terminology relevant to Agriculture

Prevention and the adoption of good practices in agriculture are the key to soil conservation. The use of modern technologies for data capture and analysis (big data) allows efficient **monitoring and prediction** of events that help to make quick and timely decisions to minimise the impact of agricultural work on soils suitable for agriculture.

The inclusion of **Industry 4.0** in agriculture will be fundamental in the coming years. The data has always been in the soil and now it is necessary its use through technological equipment and systems, identifying it, understanding the need and putting it to the benefit of farmers, allowing adapted crops, adapted production and adapted solutions.

The traditional way of farming is changing. New digital and ecological tools are the answer for farmers who want healthy, profitable and increasingly sustainable crops. **Smart Farming** secures the future of agriculture and, therefore, of feeding the current and future generations that the planet will have, contributing to the food produced with the necessary safety and the right components.

Exercise: Can we create the "perfect" farm?

©TED-Ed (2020, October 12). *Can we create the "perfect" farm? - Brent Loken* [Video]. YouTube https://www.youtube.com/watch?v=xFqecEtdGZ0

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https://www.ipcc.ch/about/

Food and Agriculture Organization of the United Nations
http://www.fao.org/climate-change/our-work/what-we-do/climate-change-strategy/en/

European Environment Agency
https://www.eea.europa.eu/publications/cc-adaptation-agriculture

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Module 3

Climate Change impacts on Wildlife and nature

Co-funded by the Erasmus+ Programme of the European Union

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M3 U1 Desertification

Prepared by CRETITHEV

Co-funded by the Erasmus+ Programme of the European Union

On completion of this module you will...

On successful completion of this resource, youth workers, youth trainers and youth leaders will be able to:	Knowledge	Skills	Attitudes
Climate change impacts on wildlife – origin and consequences	Expand the knowledge of youth workers and youth professionals about desertification and how it affects nature and wildlife.	Advance the participants' awareness.	Adopt a different lifestyle and attitude.
Climate change and desertification – direct link	Institute to the target group possible ways of prevention and fight of desertification.	Equip the participants with knowledge and tools.	Awareness of how to respond to and support young people in the delivery of the topic
Desertification and Climate change– indirect link	Comprehend the difference between weather and climate.	Distinguish between weather and climate.	Act for a sustainable life in their daily life.

Desertification

"the process of fertile land transforming into desert typically as a result of deforestation, drought or improper/inappropriate agriculture".
(Princeton University Dictionary)

The aim of this UNIT is:
- to increase the knowledge of youth workers and youth professionals about desertification and how it affects nature and wild life.
- to introduce to the target group possible ways of prevention and fight of desertification

Desertification- Main causes

Desertification is a type of land **degradation** in drylands in which biological productivity is lost due to natural processes or induced by human activities whereby **fertile areas** become increasingly **arid**. It is the **spread of arid areas** caused by a variety of factors, such as **climate change** (particularly the current global warming) and overexploitation of soil as a result of **human activity**.

Main causes

➡ Climatic variations'

Climate change, drought, moisture loss on a global

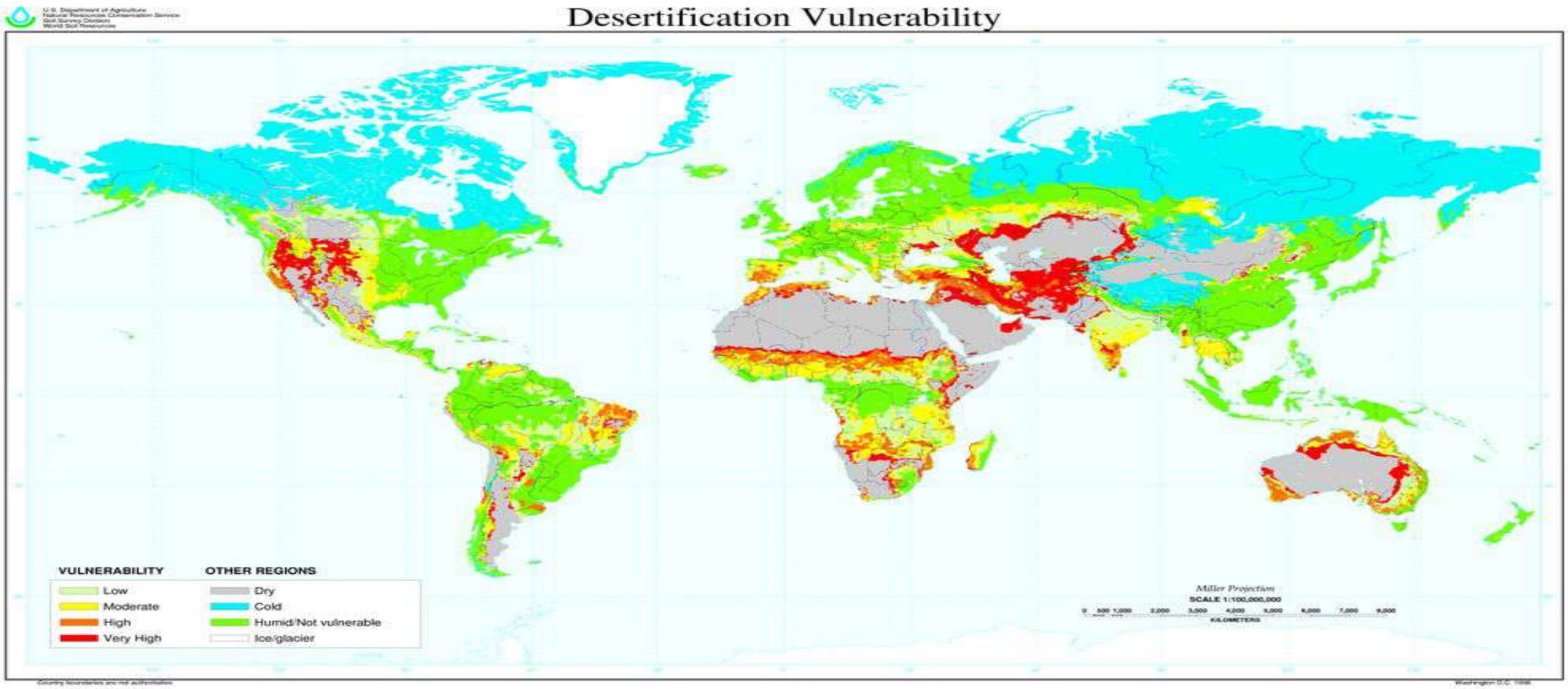
➡ 'Human activities'

overgrazing, deforestation, removal of the natural vegetation cover , agricultural activities in the vulnerable ecosystems of arid and semi-arid areas, which are thus strained beyond their capacity.

These activities are triggered by population growth, the removal of the natural vegetation cover (by taking too much fuel wood), agricultural activities in the vulnerable ecosystems of arid and semi-arid areas, which are thus strained beyond their capacity.

Population in Drylands

The table below shows the population in drylands by each continent and as a percentage of the global population of the continent.



Who is affected by desertification?

ACT NOW

"Desertification occurs on all continents except Antarctica and affects the livelihoods of millions of people, including a large proportion of the poor in drylands.

Nature is critical to our survival: nature provides us with our oxygen, regulates our weather patterns, pollinates our crops, produces our food, feed and fibre.

Drought, deforestation and climate change. All of these contribute to the extreme global issue known as desertification.

According to the environmental campaign Clean Up the World, desertification is the degradation of land in drylands, which affects all continents except Antarctica.

Approximately half of the people worldwide who live below the poverty line live in affected areas.

The result of desertification is barren land that cannot be used for crop and food production or other agricultural purposes.

Africa is the continent most affected by desertification, and one of the most obvious natural borders on the landmass is the southern edge of the Sahara Desert. The countries that lie on the edge of the Sahara are among the poorest in the world, and they are subject to periodic droughts that devastate their people.

Ferdinand Reus from Arnhem, Holland - The village of Telly in Mali

Land Loss from Desertification

ACT NOW

Arable land loss is estimated at 30 to 35 times the historical rate

Due to drought and desertification, 12 million hectares are lost each year (23 hectares per minute). Within one year, 20 million tons of grain could have been grown.

74 per cent of the poor are directly affected by land degradation globally.

Habitat loss and deterioration, largely caused by human actions, have reduced global terrestrial habitat integrity by 30 per cent relative to an unimpacted baseline.

Similarly 12 million hectares of **land** are **lost every year** to **desertification** and drought alone. This is an area that could produce 20 million tons of grain. **Desertification** and **land** degradation cause USD 42 billion in **lost** earnings **each year**.

Desertification has no boarders

Desertification has environmental impacts that go beyond the areas directly affected; it devastates people regionally and at the global scale.

For example, dust emanating from the East Asian region and the Sahara has also been implicated in respiratory problems as far away as North America and has affected coral reefs in the Caribbean.

Furthermore, loss of vegetation can increase the formation of large dust clouds that can cause ill health problems in more densely populated areas during the dry season, thousands of miles away

Natural Disasters

Desertification makes natural disasters worse because it reduces natural resilience of ecosystems. Desertification also increases vulnerability of whole regions to the unpredictable effects of climate change. Events such as flash floods, landslides and dust storms, become stronger in areas with heavily degraded soils.

A massive dust storm cloud (haboob) is close to enveloping a military camp as it rolls over Al Asad, Iraq, just before nightfall on April 27, 2005. DoD photo by Corporal Alicia M. Garcia, U.S. Marine Corps. (Released)

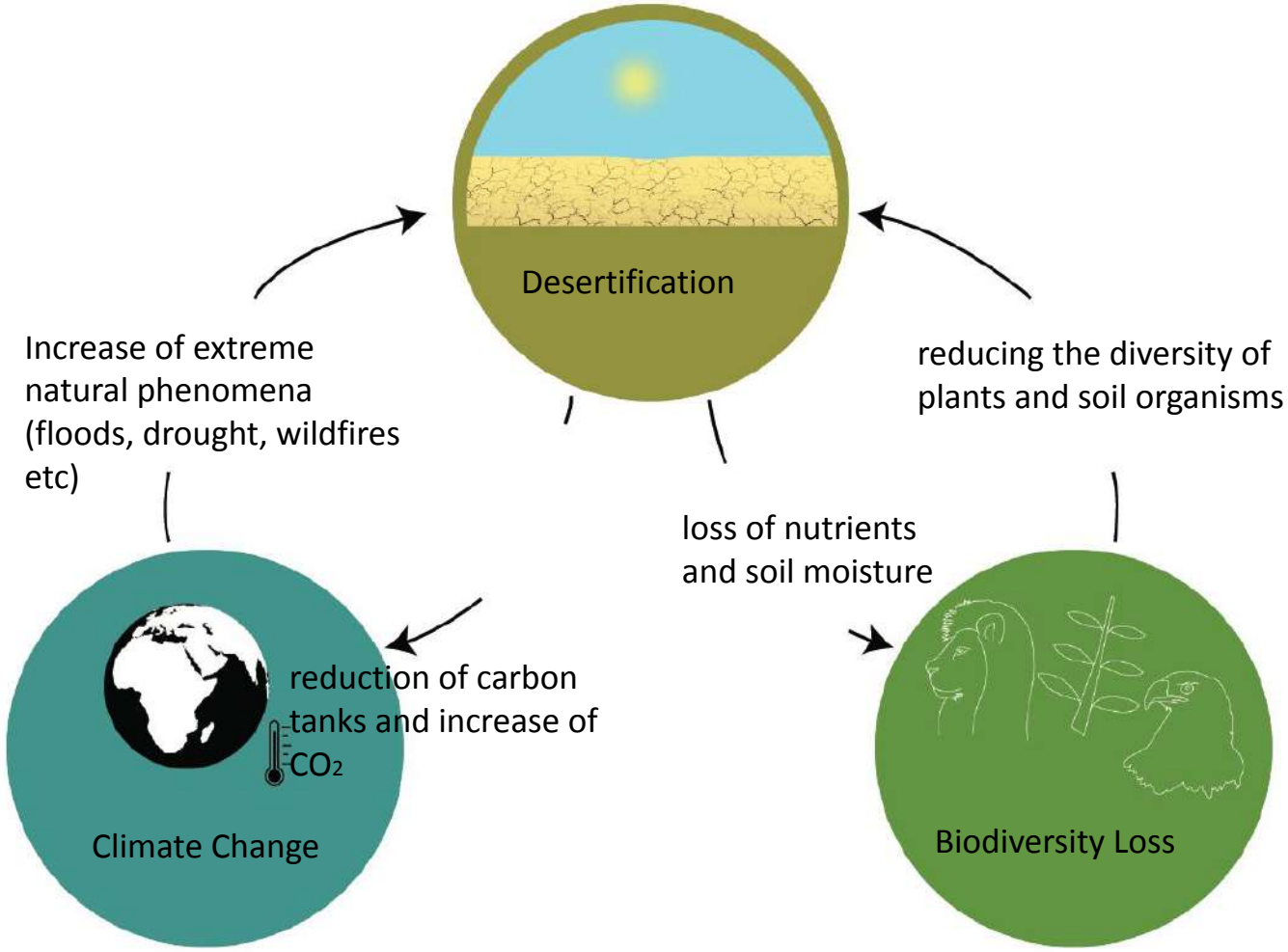
Desertification causes global warming

Desertification not only causes loss of productivity with serious impacts on food production, future food security and economic development (Safriel and Adeel, 2005; Hussein, 2008), but also causes the release of greenhouse gases to the atmosphere, thereby accelerating global warming.

Animals

Human activity has altered almost 75 per cent of the earth's surface, squeezing wildlife and nature into an ever-smaller corner of the planet.

Around 1 million animal and plant species are threatened with extinction – many within decades – according to the 2019 Global Assessment Report on Biodiversity and Ecosystem Service. The report called for transformative changes to restore and protect nature. It found that the health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever, affecting the very foundations of our economies, livelihoods, food security, health and quality of life worldwide.



Stop Desertification - Prevention

Prevention is a lot more **cost-effective** than **rehabilitation**, and this should be taken into account in policy decisions.

In order to prevent and reverse desertification, major policy interventions and changes in management approaches are needed.

Land and water management: Sustainable land use can fix issues such as overgrazing, overexploitation of plants, trampling of soils and irrigation practices that cause and worsen desertification.

Protection of vegetative cover: Protecting soil from wind and water erosion helps to prevent the loss of ecosystem services during droughts.

Alternative Farming and Industrial Techniques: Alternative livelihoods that are less demanding on local land and natural resource use, such as dryland aquaculture for production of fish, crustaceans and industrial compounds, limit desertification.

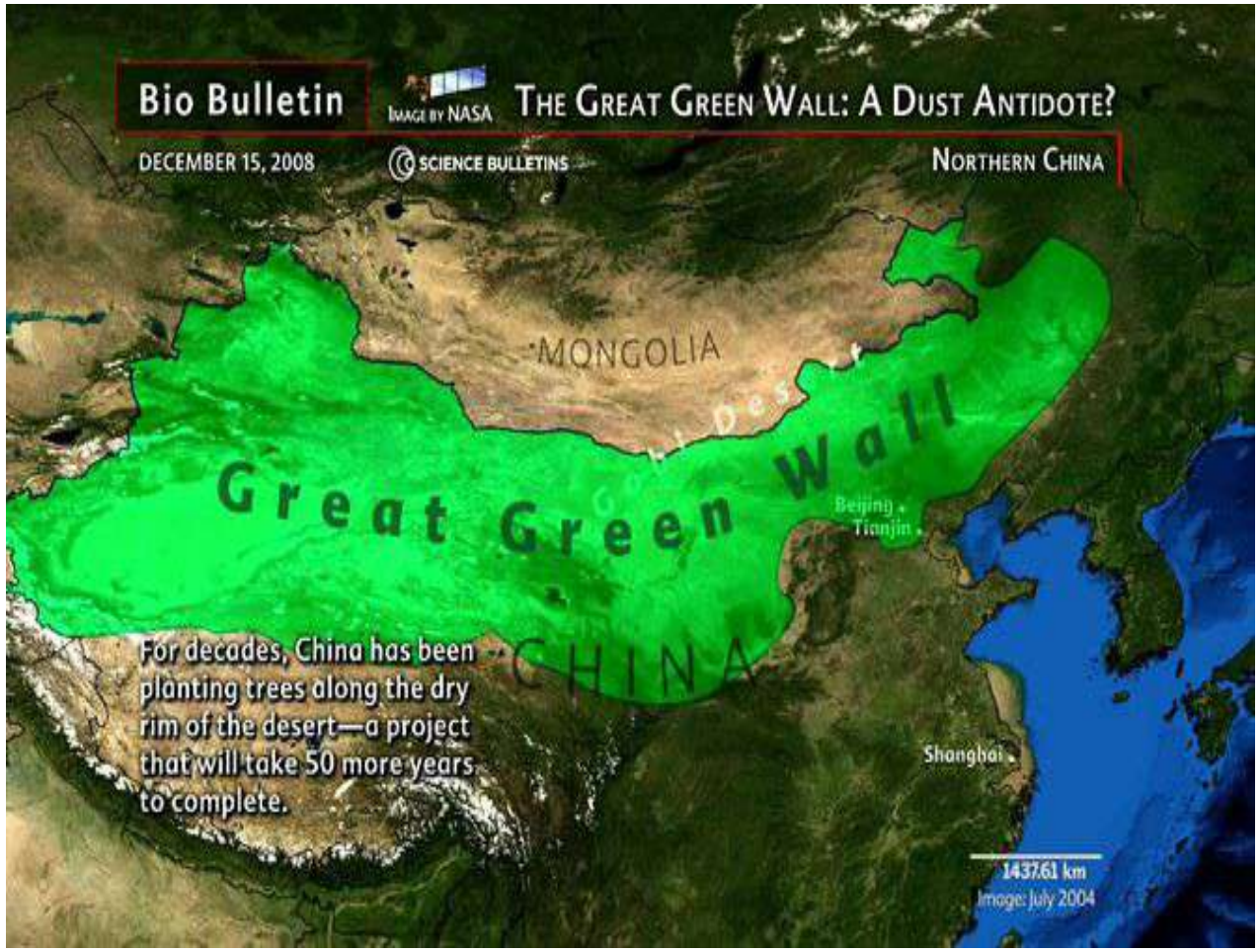
Establish economic opportunities outside drylands: Unpacking new possibilities for people to earn a living, such as urban growth and infrastructure, could relieve and shift pressures underlying the desertification processes.

Stop Desertification - Prevention

ACT NOW

‘**Great Green Wall**’ of China – a dust antidote

"The Great Green Wall," *a human-made ecological barrier designed to stop rapidly encroaching deserts and combat climate change is coming up across China. By 2050, the artificial forest is to stretch 400 million hectares – covering more than 42 percent of China's landmass.*



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ACT NOW

M3 U2 Extreme weather events

Prepared by CROMO

Co-funded by the Erasmus+ Programme of the European Union

On completion of this module you will...

On successful completion of this resource, youth workers, youth trainers and youth leaders will be able to:	Knowledge	Skills	Attitudes
Climate change and extreme weather events - direct link.	Interpret the correlation between climate elements and climate change.	Make decisions, change their habits.	Be open to supportyoung people to enhance their knowledge and tools on the issue.
Climate change and extreme weather events – indirect link.	Comprehend the indirect correlation between the climate elements and climate change.	Recognise climate anxiety.	Willingness to support young people through the knowledge gained on the climate change and extreme weather events issue.
Climate change fluctuation.	Be aware that acting against climate change is a common responsibility.	Explore the different climate fluctuation scenarios.	Voice their opinion, debate about climate change based on facts of extreme weather.

Module Aim

This module is a tool that will help trainers to teach the following knowledge:

- Comprehend the difference between weather and climate.
- Comprehend the correlation in the climate elements and the climate change.
- Acting against climate change is a common, global responsibility.
- Understand the importance of scientific studies, identify the reliable sources on the topic.

Learners will develop the following skills:

- Act for sustainable life, make decisions, change their habbits accordingly
- Voice their opinion, debate about climate change based on facts of extreme weather
- Search for scientific and fact based sources on the topic
- Avoid climate anxiety

Components of weather

Parts of weather:

- temperature
- cloudiness
- atmospheric pressure
- precipitation
- wind
- humidity

If you’re feeling hot or cold or feeling the rain fall on you, then you’re experiencing the effects of weather.

Climate, climate change

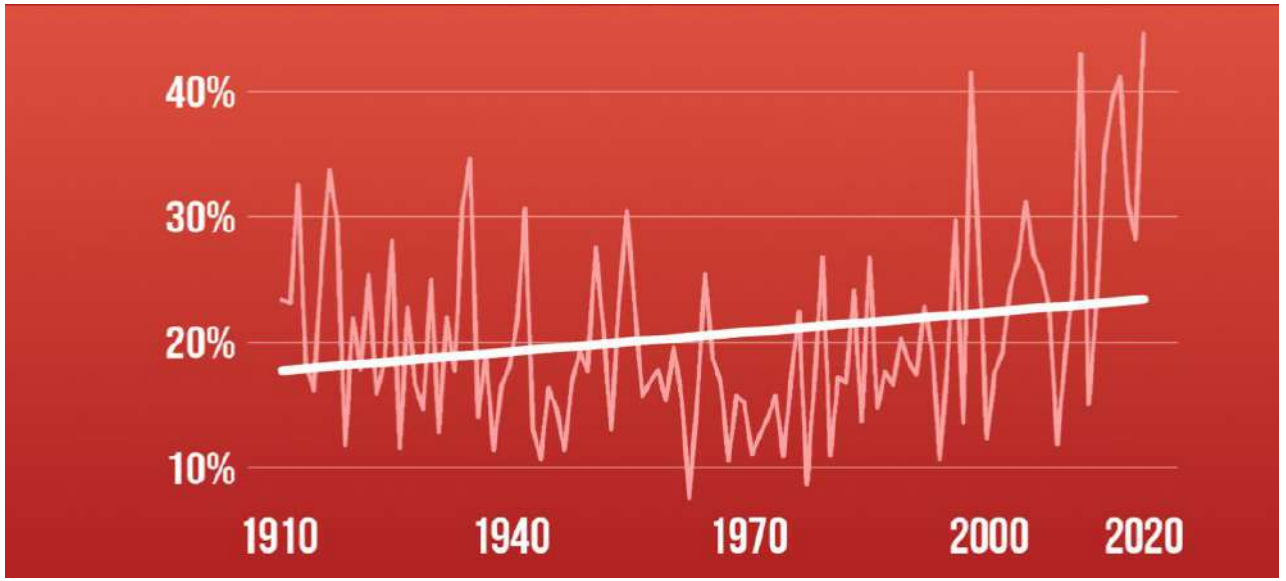
ACT NOW

Climate

Long-term pattern of weather in an area, typically averaged over a period of 30 years.

Climate change

Previous periods of climatie change,as the frequency, intensity, duration, and timing of extreme weather changes.



Extreme weather: precipitation, temperature, tropic

Source:
https://www.climatecentral.org
NOAA/NCEI Climate Extremes Index

Climate extremes

ACT NOW

- More extreme rain and snow
- More intense heat waves
- More frequent and intense droughts and floods
- Rising sea level

More extreme rain and snow

More intense heat waves

Mortality rate increases by an average of 10-15%.

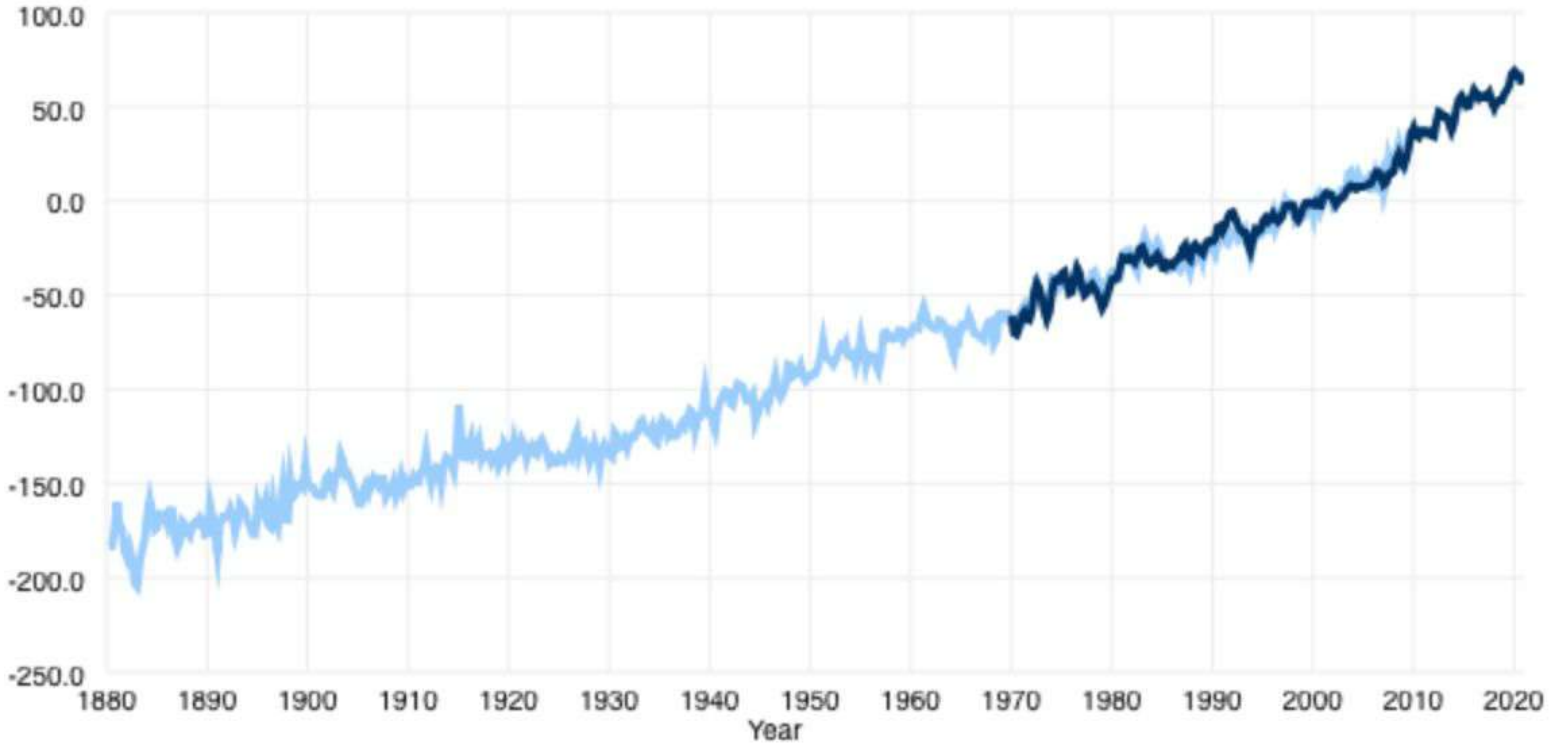
Dangerous for

- elderly people
- babies, children
- chronic patients
- those who have nowhere to go from the heat wave

More frequent and intense droughts and floods

Rising sea level

Global mean sea level has risen about 21–24 centimeters since 1880



Overview on Extreme Events

ACT NOW

Activity, The World Cafe

Organise a World Cafe on the 4 extreme weather event topics:

1. More extreme rain and snow
2. More intense heat waves
3. More frequent and intense droughts and floods
4. Rising sea level

Activity, work individually

Decide if true or false, work on worksheet. When finished, please discuss.

https://docs.google.com/document/d/1qj7xDnZAT1MeJpz_vzMbVhyLdfcmLAbSrry5xQG-sqI/edit

Climate anxiety, threatening disaster

Symptoms:

- insomnia
- restlessness
- depression
- panic attacks
- feeling of helplessness

gain information, do not panic → join others, local, collective focus →

Activity, work in groups, make Mindmap

Photo: Markus Spiske

My commitments

Write your commitments on worksheet, share your takeaways.
https://docs.google.com/document/d/1GUNoanNC1uiIPF-udy_k_Agp4QaTzpyS2_hMYkKfKzc/edit

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