# GREEN PARTICAPATION, GREEN EUROPE

## A4 Assessment of Previous Activities

PROJECT NUMBER : 2023-2-TR01-KA154-YOU-000168735








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# Climate Change, Environmental Degredation, and Plastics





# Climate Change

- Climate change involves prolonged alterations in average temperatures and weather trends. While such changes can naturally occur due to factors like solar fluctuations or significant volcanic activities, since the 1800s, human actions have emerged as the primary cause of climate change.

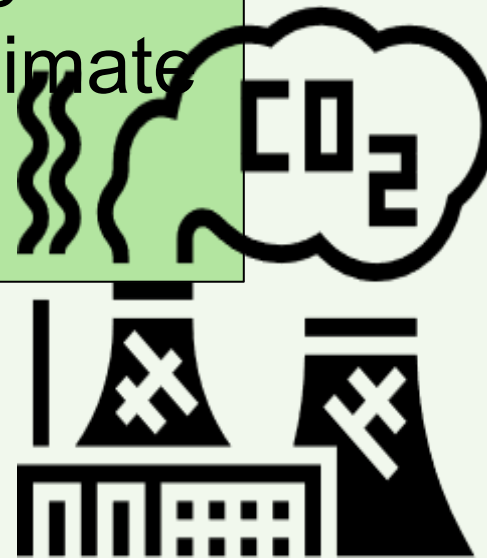


What happened at that time?



# Industrial Revolution

- The Industrial Revolution, starting in the late 18th century, marked a shift from manual labor to machine-powered factories. This change led to rapid industrial growth and a heavy reliance on fossil fuels like coal and oil. As industries expanded, so did greenhouse gas emissions, especially $CO_2$, which began to rise significantly. This increase started the process of climate change that continues to impact our planet today.



# Greenhouse Gases and Their Role

- Greenhouse gases, such as carbon dioxide ($CO_2$), methane, and nitrous oxide, trap heat in the Earth's atmosphere, creating a "greenhouse effect." This effect keeps our planet warm enough to support life.

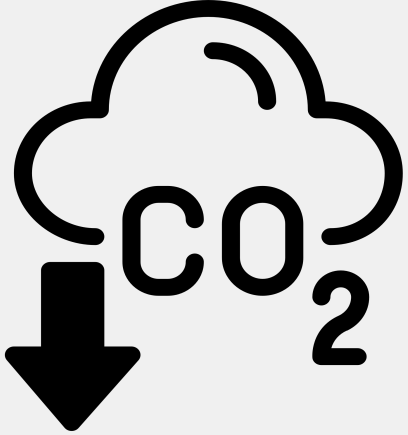


# Greenhouse Gases and Their Role

- However, since the Industrial Revolution, human activities like burning fossil fuels and deforestation have significantly increased these gases. As a result, the atmosphere traps more heat, leading to global warming and changes in weather patterns.



# Carbon Dioxide ($CO_2$)




- **Source**: CO2 is primarily released from burning fossil fuels like coal, oil, and natural gas for energy and transportation. It's also emitted through deforestation and certain industrial processes, like cement production.

- **Impact:** Although not the most potent greenhouse gas, CO2 is the most abundant one, making it the biggest contributor to human-caused climate change. It remains in the atmosphere for hundreds of years, which means its effects are long-lasting.

# Methane ($CH_4$)



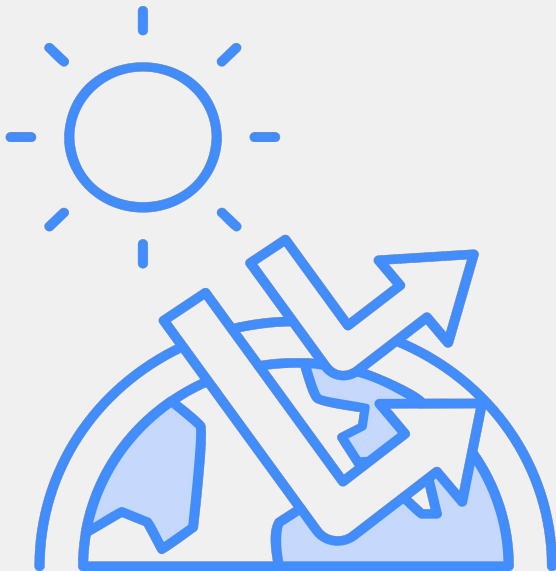

- **Source**: Methane is produced mainly through agriculture (especially livestock digestion), landfills, and natural gas extraction and distribution. Wetlands are among the natural sources of methane.

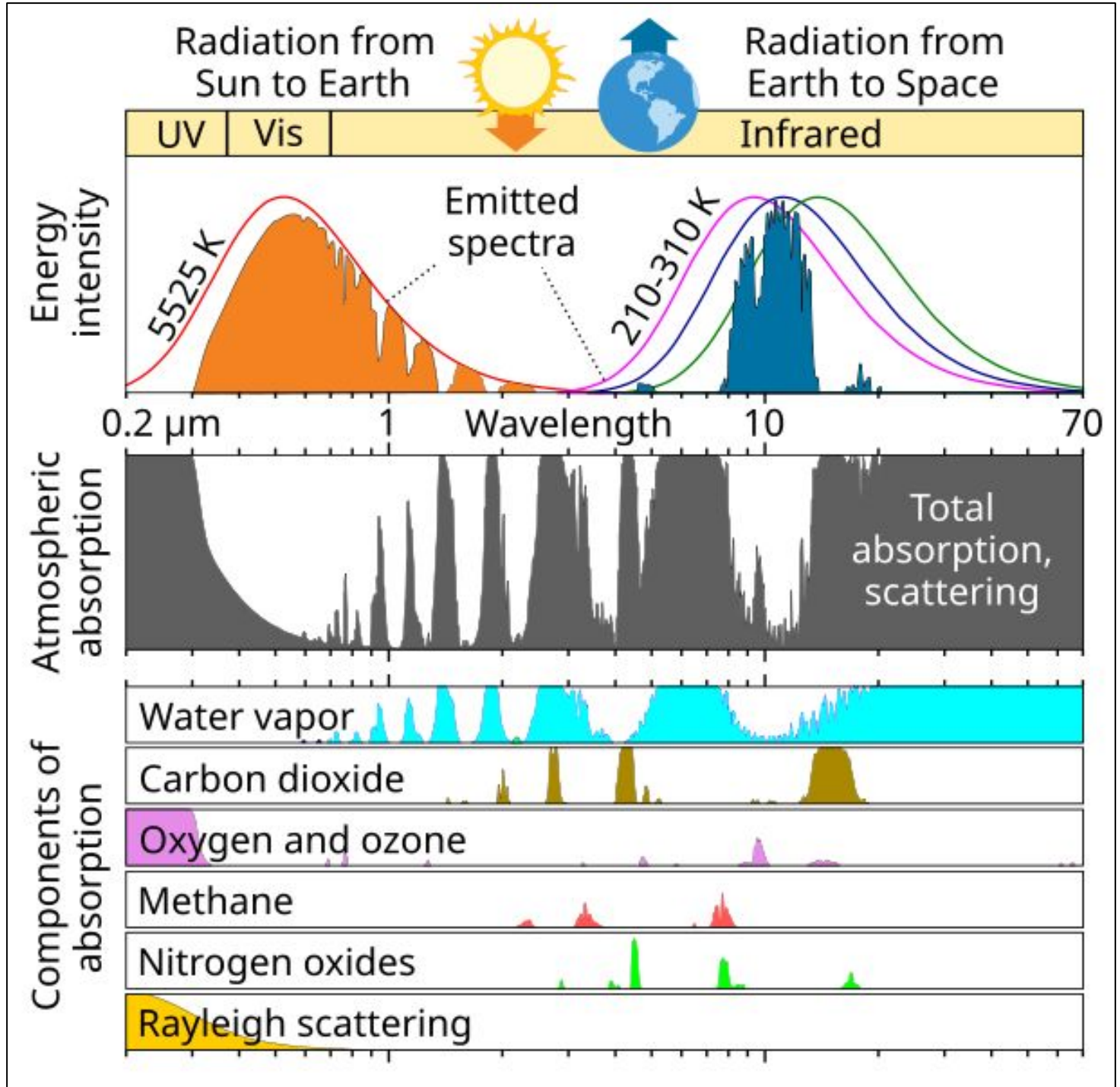
- **Impact:** Methane is about 25 times more effective than CO2 at trapping heat in the atmosphere over a 100-year period. Methane remains in the atmosphere for a relatively brief period, approximately 12 years. Because it's so potent, even small amounts of methane can have a big impact on warming.

# Nitrous Oxide ($N_2O$)

- **Source**: $N_2O$ emissions largely come from agricultural activities, particularly the use of synthetic fertilizers, as well as the burning of fossil fuels and certain industrial processes.

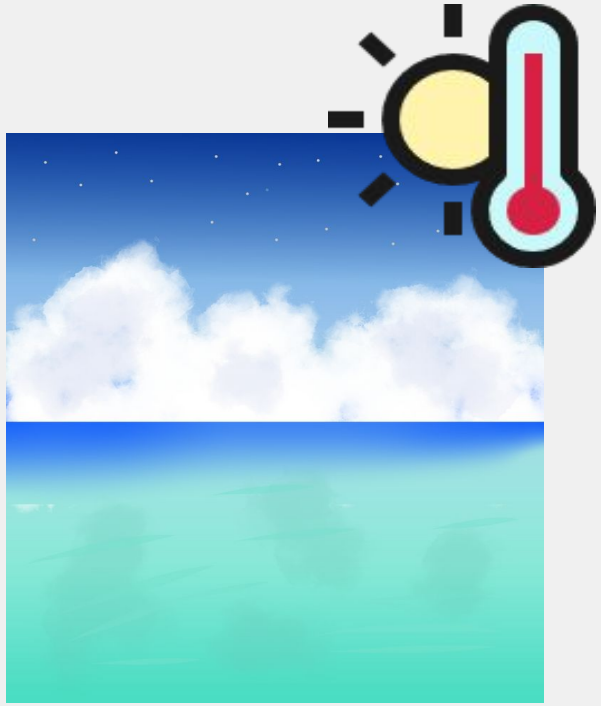
- **Impact:** Nitrous oxide is roughly 300 times more effective than CO2 at trapping heat, making it a very potent greenhouse gas. It also has a long atmospheric lifespan of over 100 years, contributing significantly to warming and even depleting the ozone layer.




Radiation from Sun to Earth
Radiation from Earth to Space
UV
Vis
Infrared
Energy intensity
5525 K
Emitted spectra
210-310 K
0.2 μm
1
Wavelength
10
70
Atmospheric absorption
Total absorption, scattering
Components of absorption
Water vapor
Carbon dioxide
Oxygen and ozone
Methane
Nitrogen oxides
Rayleigh scattering

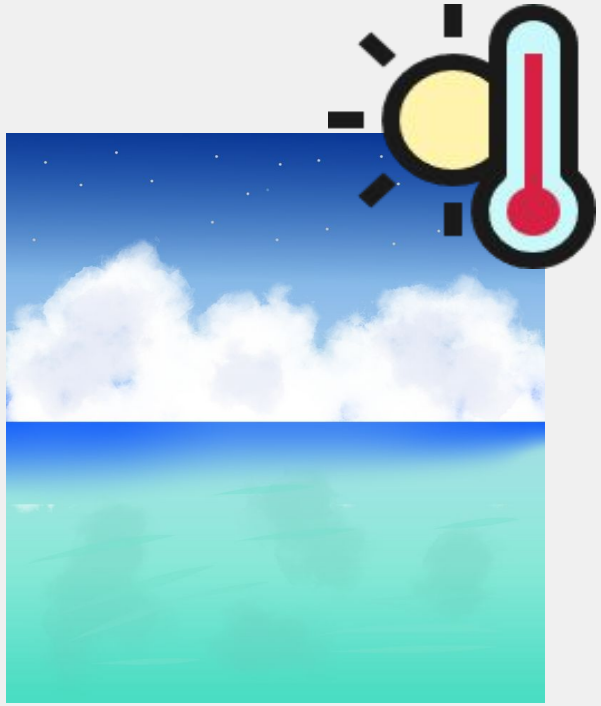
# Special role of water vapor

- **Source**: It enters the atmosphere mainly through evaporation from oceans, lakes, and rivers, and through transpiration from plants. Human activities influence water vapor levels indirectly by raising global temperatures, which in turn increases evaporation rates.

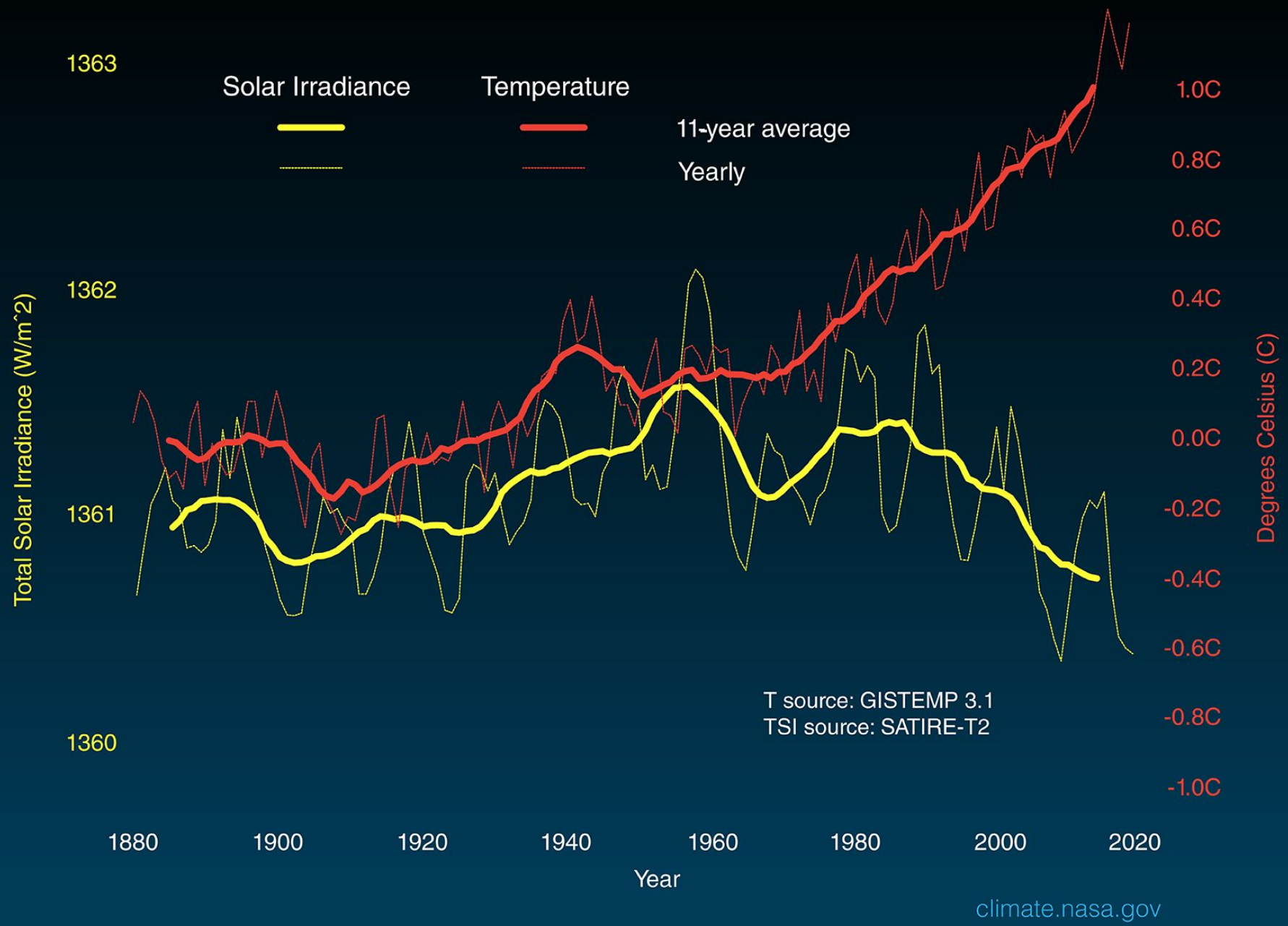


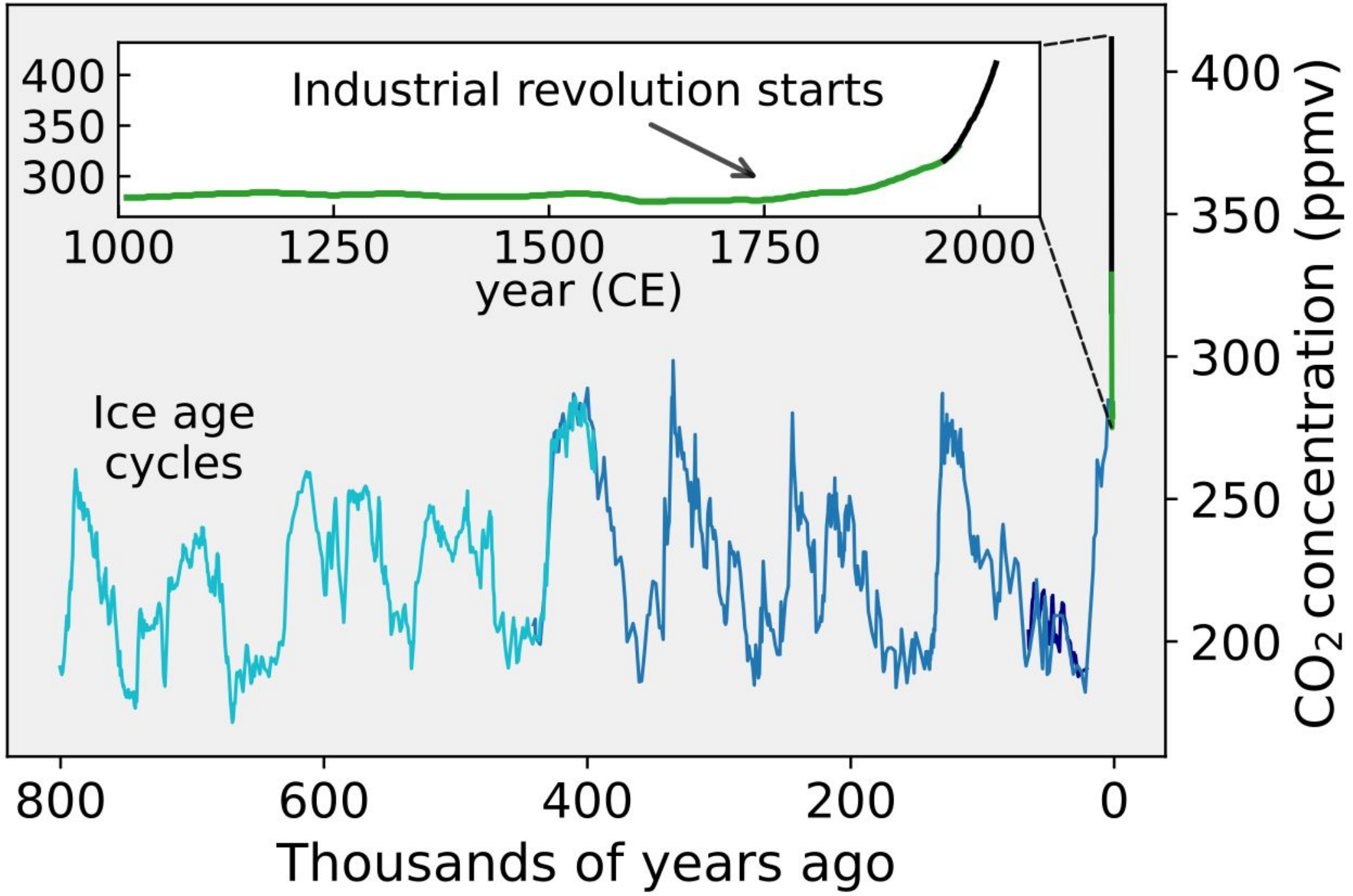
# Special role of water vapor

- **Impact:** Water vapor is the most abundant greenhouse gas and has a powerful warming effect. It acts as a feedback mechanism: as temperatures rise due to other greenhouse gases, more water vapor enters the atmosphere, further amplifying the greenhouse effect. Although water vapor cycles quickly through the atmosphere, its presence magnifies warming caused by other gases.



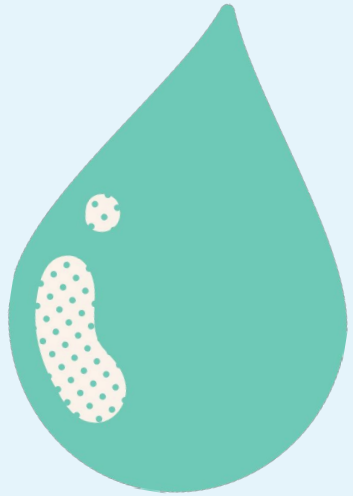
# Temperature vs Solar Activity

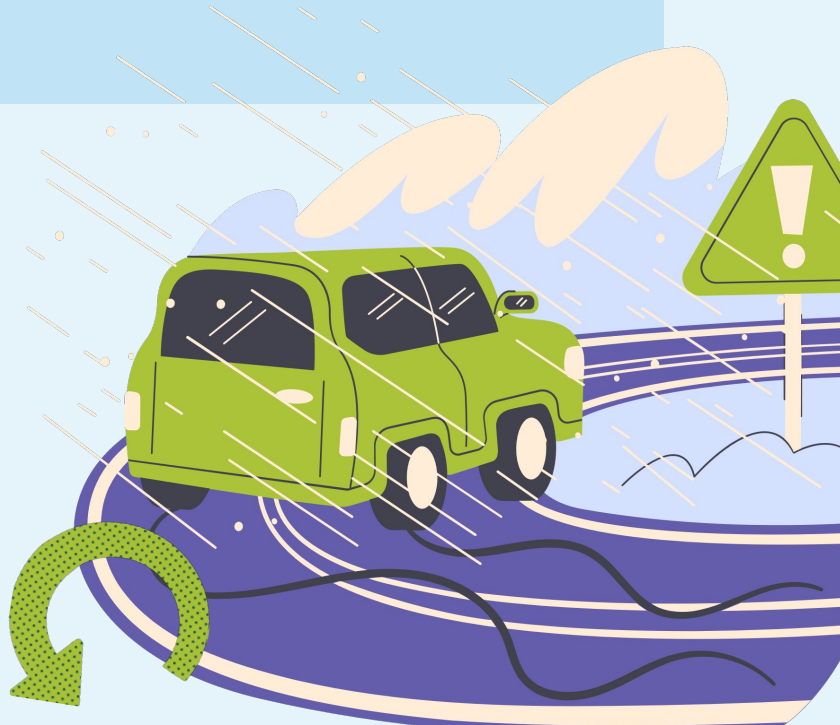



Industrial revolution starts
400
350
300
1000
1250
1500
1750
2000
year (CE)
Ice age
cycles
800
600
400
200
0
Thousands of years ago
400
350
300
250
200
$CO_2$ concentration (ppmv)

# Impacts of Climate Change

- Climate change is already having significant impacts on both our planet and its ecosystems.



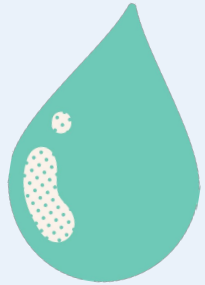


# Rising Temperatures

- **Global Warming:** Average global temperatures have risen by about 1.1°C since the late 19th century, with most of this warming occurring in the last few decades. The primary driver of this is the rise in greenhouse gas emissions.

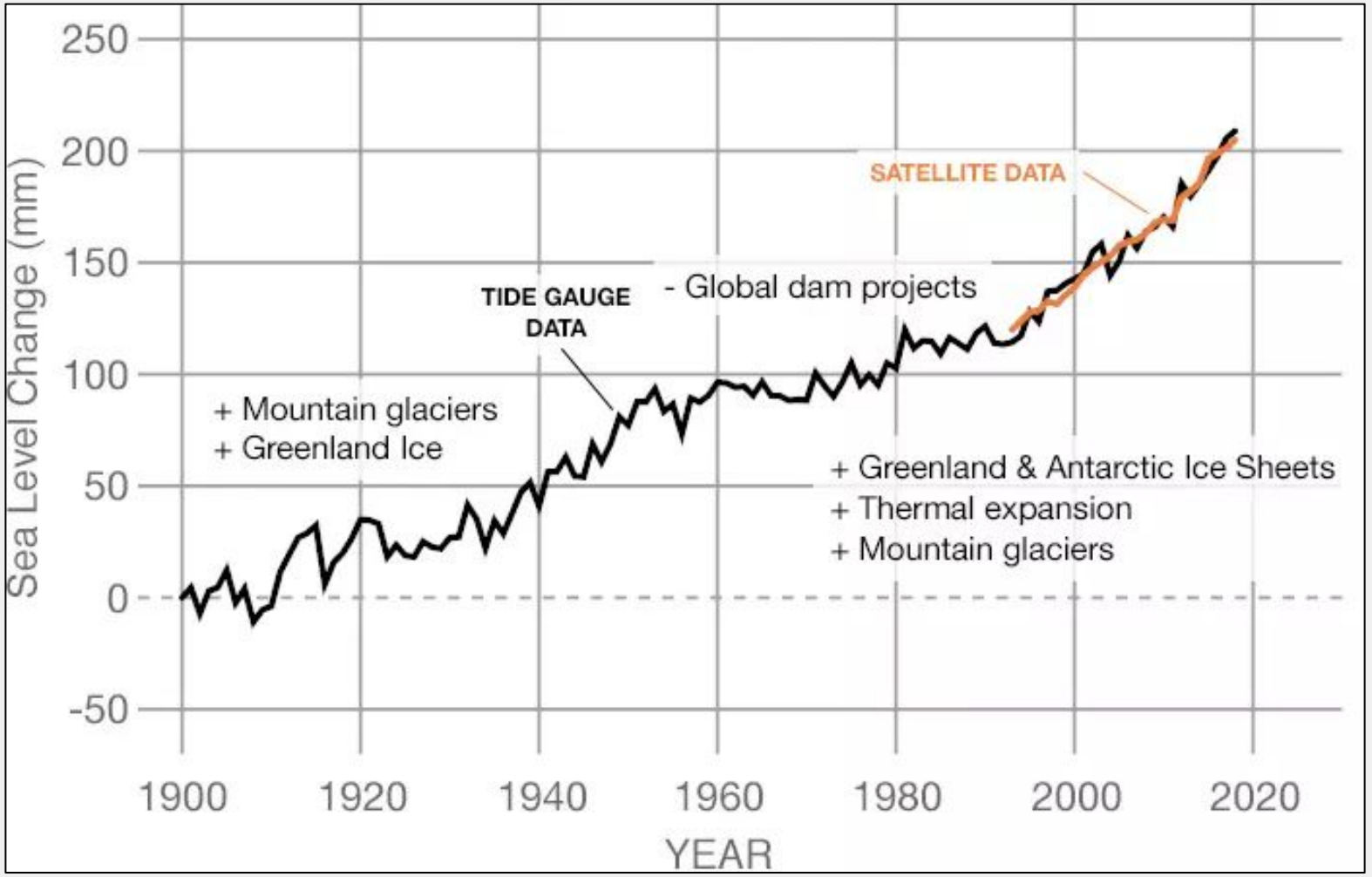
- **Heatwaves:** More frequent and intense heatwaves are affecting human health, causing heat-related illnesses and even fatalities. These extreme temperatures also stress crops and livestock, impacting food security.

# Melting Ice and Rising Sea Levels



- **Melting Glaciers and Polar Ice:** Warming temperatures cause glaciers and polar ice caps to melt, contributing to rising sea levels. This not only reduces habitats for species like polar bears but also contributes to coastal erosion.

- **Rising Sea Levels:** Sea levels have risen about 20-23 cm since 1880, and the rate is accelerating. Higher sea levels threaten coastal cities and small island nations, displacing communities and endangering infrastructure.



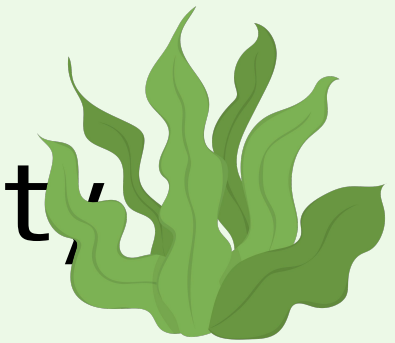

The graph illustrates sea-level changes from 1900 to 2018, highlighting contributing factors (+) and mitigating factors (-), presented at their respective periods of influence.

# Extreme Weather Events

- **Increased Frequency and Intensity of Storms:** Climate change fuels stronger hurricanes, cyclones, and typhoons, leading to devastating flooding, damage to infrastructure, and loss of life.

- **Droughts and Wildfires:** Changes in precipitation patterns are causing longer and more severe droughts. This, in turn, increases the risk of wildfires, which destroy ecosystems, homes, and livelihoods.

# Impact on Ecosystems and Biodiversity

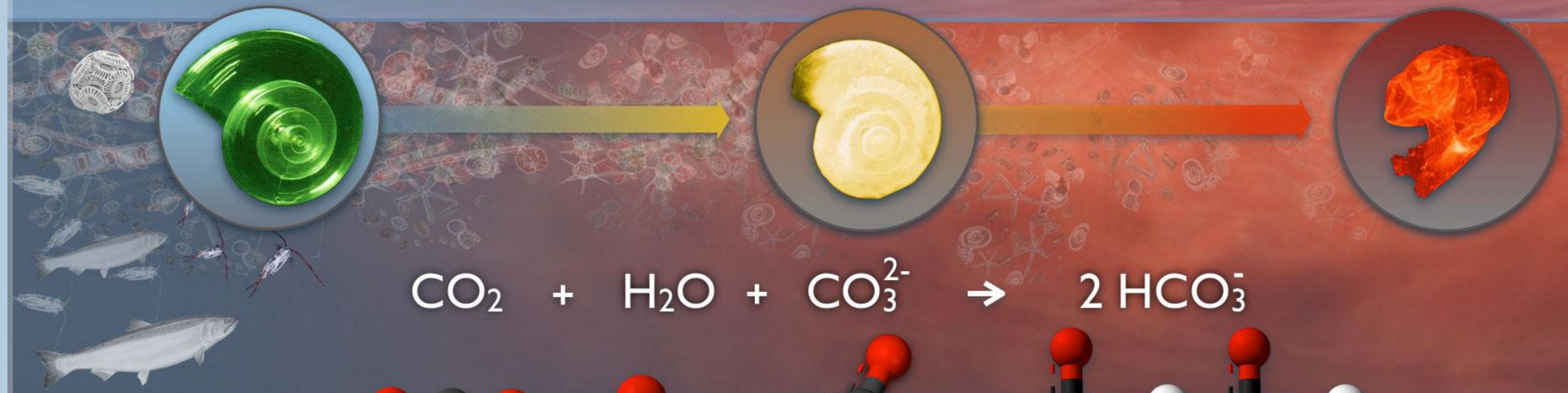


- **Habitat Loss and Species Extinction:** As climates shift, many species struggle to adapt, leading to a decline in biodiversity. Coral reefs, for instance, are dying due to warming oceans and acidification, affecting marine life that depends on these ecosystems.
- **Disruption of Ecosystems:** Changes in temperature and rainfall patterns alter ecosystems, affecting species migration and breeding patterns. This disrupts food chains and threatens both terrestrial and aquatic life.

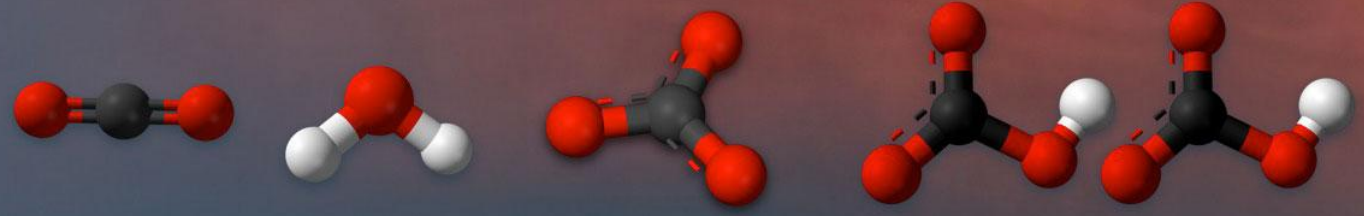
# Ocean Acidification

How will changes in ocean chemistry affect marine life?

$CO_2$ absorbed from the atmosphere



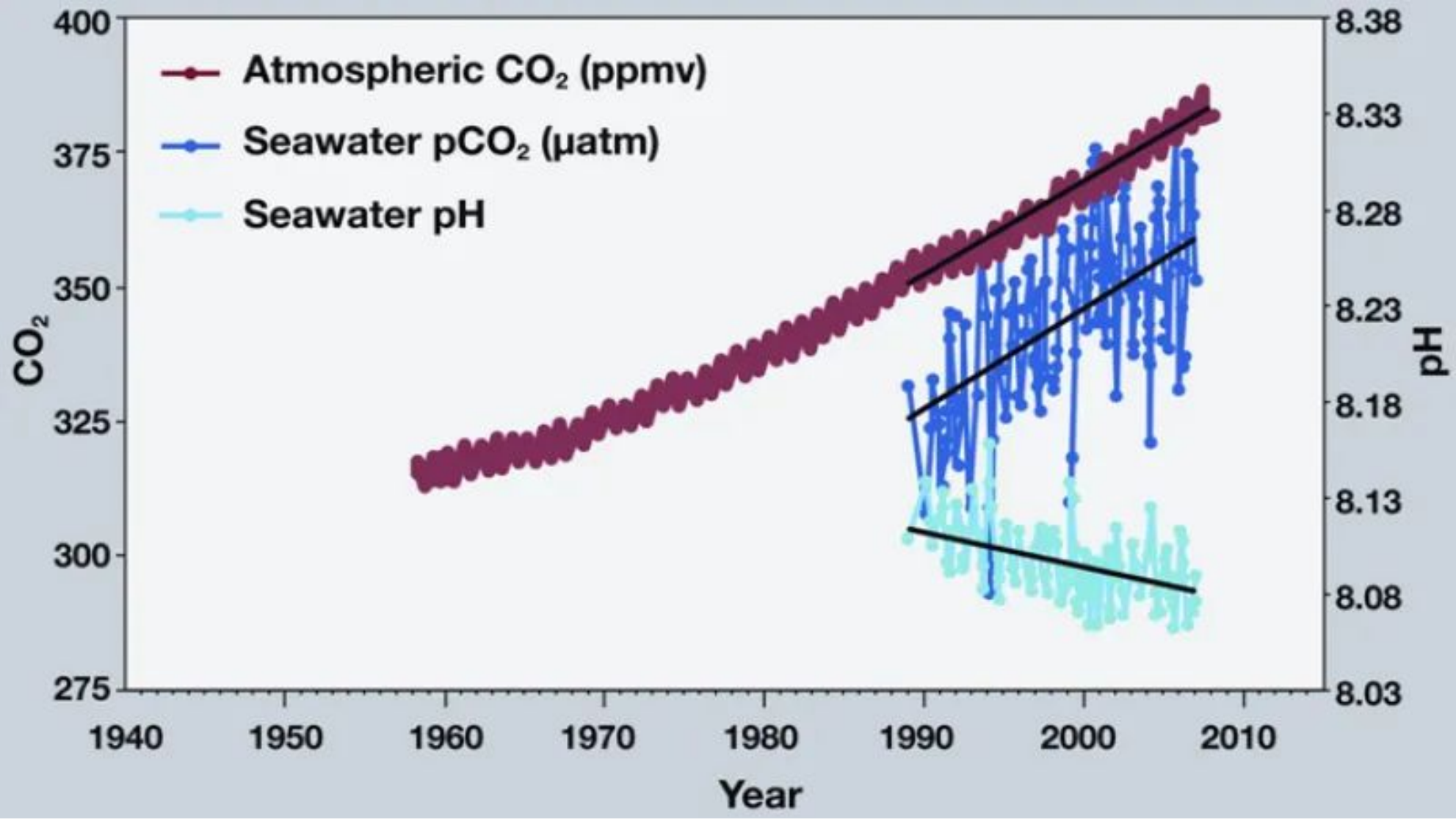
$$CO_2 + H_2O + CO_3^{2-} \rightarrow 2\,HCO_3^-$$

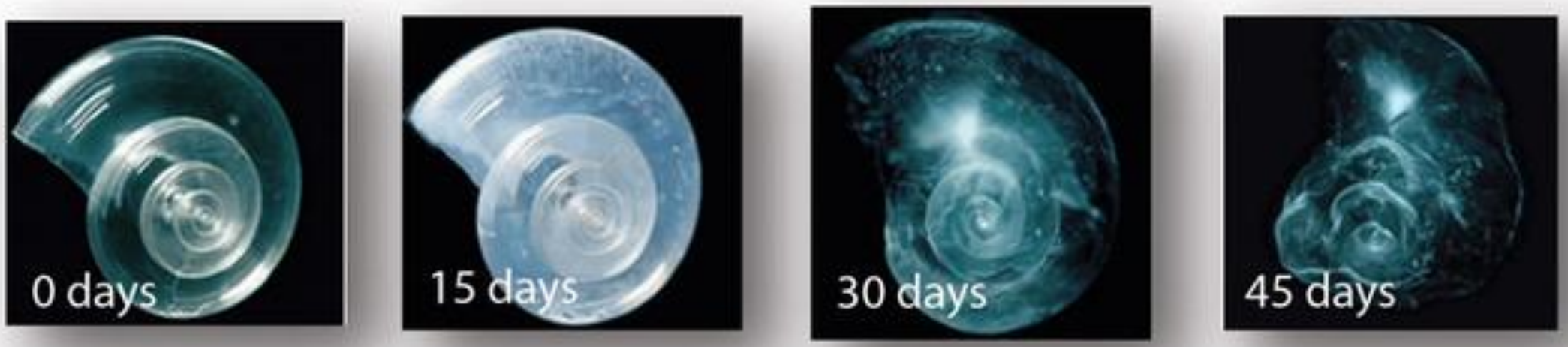


carbon dioxide | water | carbonate ion | 2 bicarbonate ions

consumption of carbonate ions impedes calcification

# Ocean Acidification






- **Impact on Marine Life:** Increased CO2 levels lead to ocean acidification, which harms marine organisms like coral, shellfish, and certain plankton species. This has a cascading effect on marine ecosystems and the communities that rely on them for food and income.

# Coral Reefs as Home



# Disrupted Food Chain



# to Plates: The Economic Importance of Marine Life



# Human Health and Livelihoods

- **Health Risks:** Climate change exacerbates air pollution, spreads diseases like malaria and dengue, and increases the prevalence of respiratory and cardiovascular diseases.



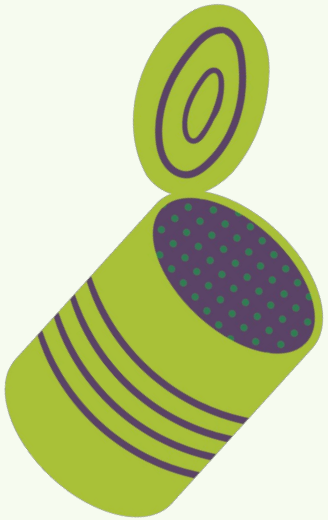
- **Impact on Agriculture:** Changing weather patterns affect crop yields, leading to food insecurity and higher food prices. Communities dependent on farming and fishing are particularly vulnerable.

# Social and Economic Impacts



- **Displacement and Migration:** Rising sea levels, extreme weather, and other climate impacts force people to leave their homes, leading to climate refugees and increased strain on resources in new areas.

- **Economic Costs:** Climate-related disasters result in significant economic losses, affecting infrastructure, property, and resources. Countries, particularly developing ones, face financial challenges in adapting to and mitigating these impacts.



# Environmental Degradation

- Environmental degradation refers to the deterioration of the natural environment due to human activity. This includes the depletion of natural resources, the destruction of ecosystems, and pollution that harms air, water, and soil quality.



# Causes of Environmental Degradation

- **Deforestation:** Forests are cleared for agriculture, urban development, and logging, leading to habitat loss, reduced biodiversity, and increased carbon dioxide in the atmosphere as fewer trees are available to absorb $CO_2$.



# Pollution:

- **Air Pollution:** Emissions from vehicles, factories, and other sources release harmful chemicals into the air, contributing to respiratory problems in humans and animals, as well as climate change.
- **Soil Pollution:** Chemicals from pesticides, fertilizers, and industrial waste degrade soil quality, impacting agriculture and reducing the ability of land to support plant life.
- **Water Pollution:** Industrial waste, agricultural runoff, and plastic pollution contaminate water bodies, harming marine life and affecting water quality for human consumption.

## Overexploitation of Natural Resources:

- **Overfishing:** Unsustainable fishing practices reduce fish populations, disrupt marine ecosystems, and threaten food security.

- **Mining and Extraction:** Mining for minerals, oil, and other resources leads to habitat destruction and pollution, often leaving landscapes damaged and ecosystems unbalanced.

- **Climate Change**: Environmental degradation and climate change are interconnected. For example, deforestation and pollution contribute to climate change, which in turn accelerates degradation by increasing the frequency of natural disasters, causing ocean acidification, and intensifying heat waves and droughts.



# Impacts of Environmental Degradation

- Environmental degradation has severe consequences for the planet and all its inhabitants:



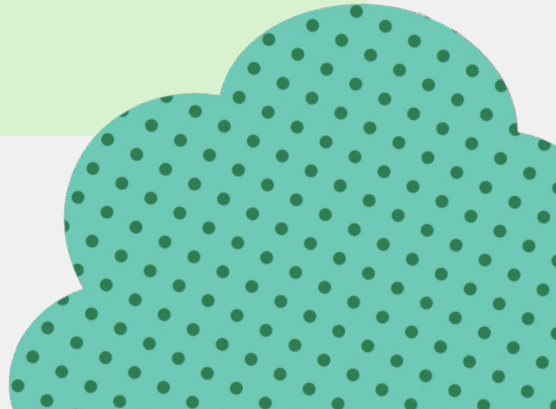
- **Loss of Biodiversity:** As habitats are destroyed, countless species face extinction, reducing biodiversity and weakening ecosystems' resilience.

- **Health Impacts:** Polluted air, water, and soil contribute to health problems, including respiratory diseases, waterborne illnesses, and food insecurity.



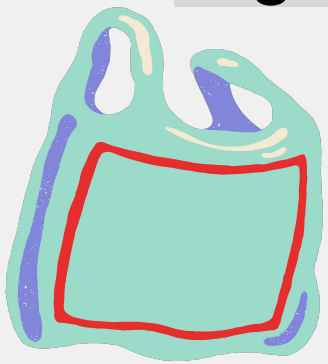
- **Economic Costs:** Environmental degradation leads to significant economic losses due to reduced agricultural productivity, the cost of healthcare for pollution-related illnesses, and the expense of restoring damaged ecosystems.

- **Climate Vulnerability:** Degraded environments are less capable of withstanding the effects of climate change, making ecosystems and human communities more vulnerable to extreme weather events and rising temperatures.



# Plastics and Their Environmental Impact

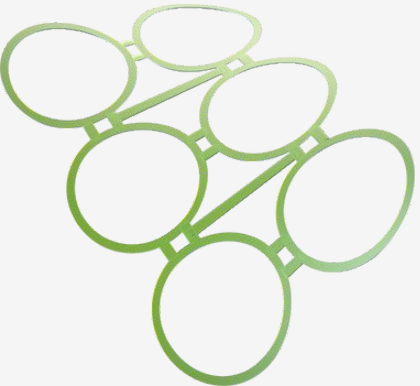
Plastics, especially single-use plastics like bags, bottles, and utensils, have become a pervasive environmental problem. Although convenient, these items take hundreds of years to decompose, accumulating in landfills and polluting ecosystems. Single-use plastics, commonly used in kitchens and other areas of daily life, contribute significantly to environmental degradation.





# Environmental Impact of Plastics

- **Persistence in the Environment:** Plastics do not fully break down; instead, they fragment into smaller particles called microplastics. These microplastics contaminate soil, rivers, and oceans, where they are ingested by marine life and enter the food chain, ultimately reaching humans.







- **Harm to Marine Life:** Plastics harm marine animals that mistake them for food, leading to ingestion, entanglement, and often death. Sea turtles, birds, and fish are especially vulnerable, as plastic waste disrupts entire ecosystems and reduces biodiversity.

- **Microplastics in Human Bodies:** Microplastics are now found in human bodies, with studies detecting them in unexpected places like the lungs, blood, and even placental tissues. This raises serious health concerns, as the long-term effects of microplastics on human health are still not fully understood.



# Why Reducing Plastic Use is Essential



- **Preventing Ecosystem Damage**: Reducing single-use plastic helps prevent pollution and reduces the impact on ecosystems. Every piece of plastic avoided means one less item that could harm wildlife or linger in the environment for centuries.

- **Limiting Microplastic Exposure:** By cutting down on plastic use, we can reduce the amount of microplastics released into the environment, lowering the risk of these particles entering our food and water.

# Large-Scale Solutions to Combat Plastic Pollution

- To effectively combat plastic pollution, actions beyond individual changes are essential. Manufacturing practices, waste management, and government policies play a significant role in reducing plastic usage and waste.



- **Promote Alternatives to Plastic in Manufacturing**: Encouraging the development and use of biodegradable or compostable materials can significantly reduce plastic pollution. Shifting packaging materials and product designs to include sustainable alternatives can curb plastic dependency from the production level.

- **Implementing Better Waste Management Systems:** Governments and municipalities can invest in advanced recycling facilities, improved waste collection systems, and policies that encourage the reuse of materials. This approach decreases the quantity of plastic waste reaching landfills or oceans.

- **Extended Producer Responsibility (EPR)**: EPR policies hold manufacturers accountable for the end-of-life disposal of their products. By ensuring that companies are responsible for the waste they produce, EPR can drive them to adopt more sustainable practices and reduce plastic waste.

- **Plastic Bans and Regulations:** Governments can enact bans on single-use plastics, such as plastic bags, straws, and cutlery, reducing the amount of disposable plastic in circulation. Tax incentives for businesses that reduce plastic use can also promote more sustainable practices.



# Individual Actions to Reduce Plastic Use

- While large-scale changes are critical, individual actions also play a significant role in reducing plastic pollution. By adjusting daily habits, individuals can reduce their own plastic footprint and encourage broader cultural shifts towards sustainability.

- **Use Reusable Items:** Bring reusable bags, water bottles, and containers to avoid single-use plastic items. Small changes like these can lead to significant reductions in plastic waste over time.





- **Opt for Alternatives to Plastic:** Whenever possible, choose products made from glass, stainless steel, or other sustainable materials. Avoid plastic-packaged goods by choosing fresh produce and supporting bulk stores.

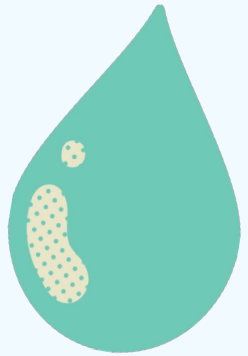
- **Avoid Microbeads and Microplastics:** Many personal care products, like face scrubs and toothpaste, contain microbeads, which are small plastic particles. Check labels for ingredients like polyethylene (PE) and polypropylene (PP), and choose natural alternatives to minimize microplastic pollution.





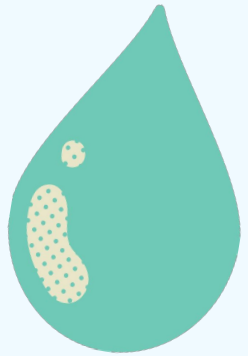
THE OCEAN CLEANUP

# The Ocean Cleanup



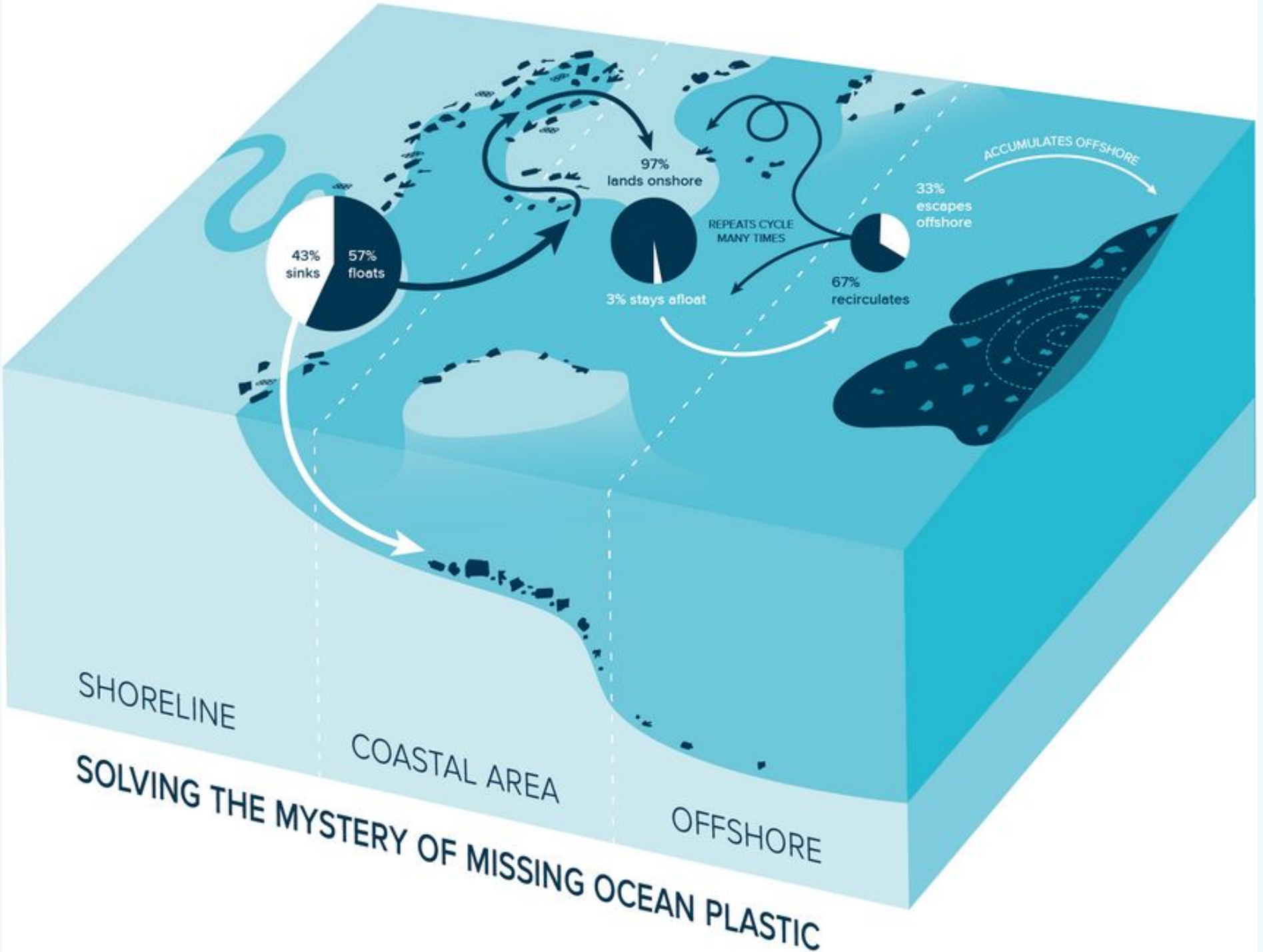
- The Ocean Cleanup is a nonprofit foundation which was founded in 2013 by Dutch inventor Boyan Slat.
- The Ocean Cleanup employs a diverse team of 120 experts, including engineers, scientists, and modelers, all dedicated to removing plastic from the oceans.
- Their aim is to have removed 90% of floating ocean plastic by 2040.

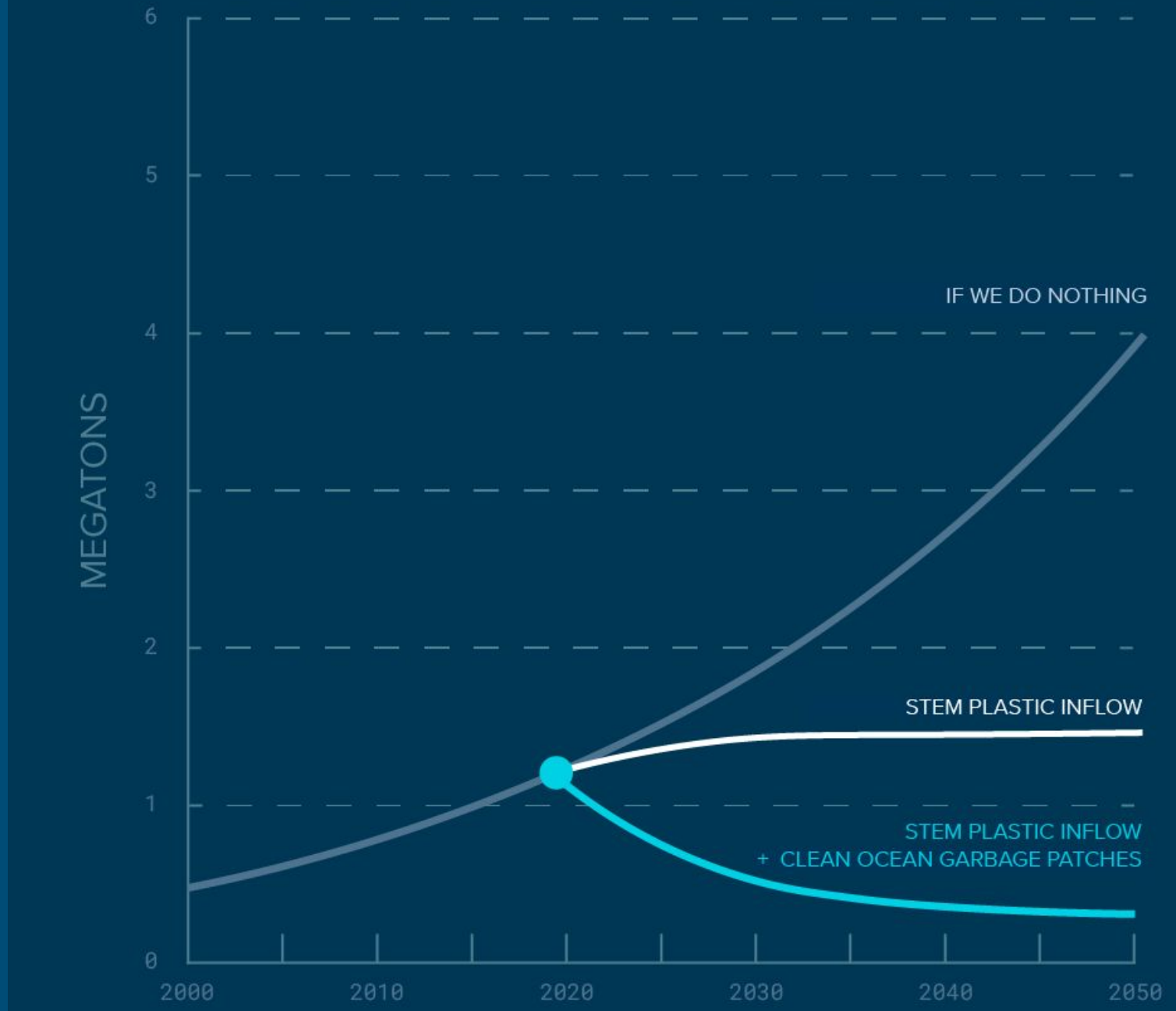
# The Ocean Cleanup



- The organization targets rivers because approximately 80% of ocean plastic pollution is estimated to originate from just 1,000 rivers.

- Ocean Cleanup also focuses on recycling the collected plastic, transforming it into products or materials that can be reused, thereby reducing environmental harm.


97%
lands onshore
43%
sinks
57%
floats
3% stays afloat
REPEATS CYCLE
MANY TIMES
67%
recirculates
33%
escapes
offshore
ACCUMULATES OFFSHORE
SHORELINE
COASTAL AREA
OFFSHORE
SOLVING THE MYSTERY OF MISSING OCEAN PLASTIC


MEGATONS
6
5
4
3
2
1
0
2000
2010
2020
2030
2040
2050
IF WE DO NOTHING
STEM PLASTIC INFLOW
STEM PLASTIC INFLOW
+ CLEAN OCEAN GARBAGE PATCHES




https://youtu.be/iDKRA0fAz-k?si=vM_fnETsMhMxWSRX

# Solutions for Combating Climate Change and Environmental Degradation





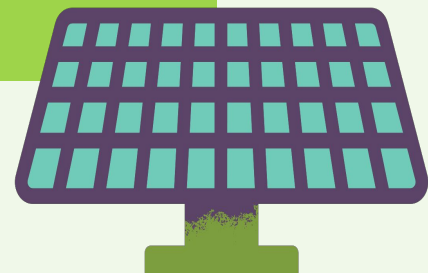

# Solutions at the Producer and Institutional Level



## Transition to Renewable Energy:

- **Reducing Fossil Fuel Dependency:** Companies should transition from fossil fuels to renewable energy sources like solar, wind, geothermal, and biomass to decrease greenhouse gas emissions.

- **Investment in Energy Efficiency Technologies:** Production processes can incorporate energy-efficient technologies and automation systems that minimize energy consumption, reducing overall environmental impact.



IRENA
International Renewable Energy Agency

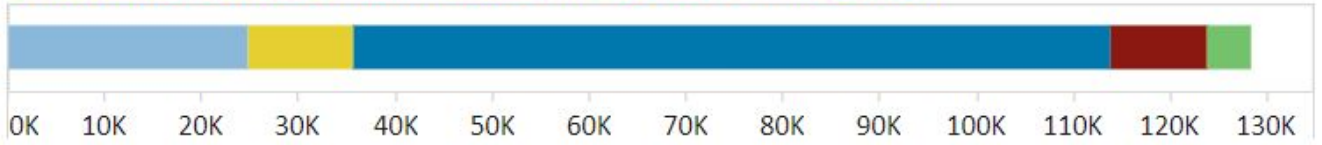
# Avoided Emissions Calculator

**1. Select Country/area**: Türkiye

**Select RE Technology**: (All)

**Select Year**: 2020

## 2. Electricity Generated from Renewables (GWh) (Türkiye, 2020)

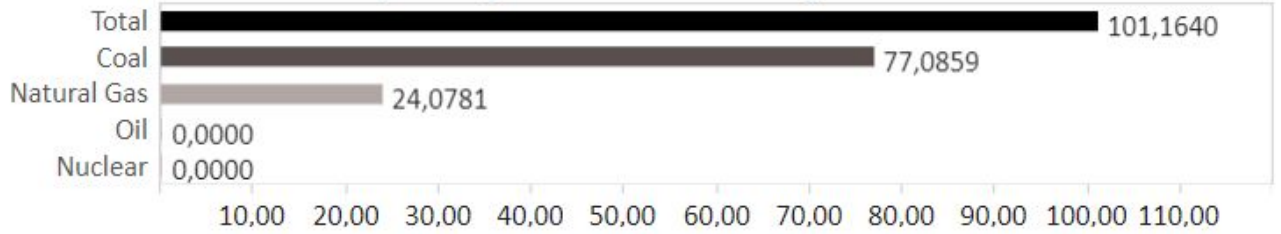



## 3.Non-renewable Mix Replaced

*Select your scenario:*

| | Coal% | Natural Gas% | Oil% | Nuclear% |
|---|---|---|---|---|
| Default Values | *60,0* | *40,0* | *0,0* | *0,0* |
| Define Mix | 50 | 30 | 20 | 0 |

## Non-renewable Emissions Replaced (Million Tonnes CO2eq)




Assuming the renewable energy electricity generation in **(2)** replaces the non-renewable fuel mix generation scenario in **(3)**, the country has avoided the following amount of emissions:

**Avoided Emissions**

**99,52 Million Tonnes CO2eq**

Note: This calculator provides an estimate of the emissions that have been avoided due to a country's uptake of renewables in a given year. This value will var greatly depending on the non-renewable mix that has been replaced by renewables. It therefore can only be used to provide a general indication of avoided emissions for various scenarios rather than an absolute number which will require further information on baseline electricity use and technology displacemer options. More details related to assumptions made, calculations and data sources used can be found in the methodology document.

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**Reducing Waste and Strengthening Recycling:**

- Businesses can design products and packaging that are recyclable or reusable, which supports a circular economy and minimizes waste.



**Setting Carbon Emissions Targets:**

- Companies can set goals to become carbon-neutral by offsetting their emissions through carbon capture or offset programs.



**Sustainable Agriculture and Forestry Practices:**

- Companies can adopt soil-friendly farming techniques and invest in reforestation efforts, which help store carbon and maintain biodiversity.



## Optimizing Water Use and Wastewater Management:

- **Efficient Water Use Technologies:** Industries should implement water-saving technologies and reuse systems, which can include greywater recycling to minimize water consumption.

- **Enhanced Wastewater Treatment:** Strengthen industrial wastewater treatment systems to prevent pollution and allow for the safe reuse of water where possible.



# Solutions at the Individual Level

- **Reducing Energy Consumption:** Simple actions like using LED bulbs, installing a smart thermostat, and choosing energy-efficient appliances can help reduce energy use at home.

- **Conscious Shopping and Choosing Sustainable Products:** Opt for products with eco-friendly certifications and prioritize buying items that are produced sustainably.



- **Using Alternative Transportation Options:** Walk, bike, or use public transportation whenever possible to reduce your personal transportation emissions.

- **Supporting Green Investments and Financial Choices:** Choose banks and financial services that focus on sustainable investments, or consider green investment funds that promote renewable energy and environmental conservation.



- **Engaging with Local Environmental Projects**:

  Get involved with or support local environmental initiatives, such as clean-up events or community gardens, to make a positive impact close to home.







- These actions can help both producers and individuals make meaningful contributions to combating climate change and protecting the environment. By making these changes, we can collectively work towards a more sustainable and resilient future.





# Thank You For Listening!





