

CLIMATE EMERGENCY & OCEANS



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CONTENT



Introduction



The climate crisis



What is it?



What are the causes?



Possible solutions



The effects of the climate crisis at large



Rising temperatures



Melting of glaciers and ice caps



Sea level rise



Ocean acidification



Extreme weather phenomena



Biodiversity loss



Changes in ecosystems and species distribution



Changes in precipitation patterns



Threats to agriculture and food security



Impact on health



What does our organization do?



Final note



INTRODUCTION

This material has been created to be given to young people before attending the Ocean & Climate Change workshop to facilitate better understanding and engagement.

It is important that young people are aware of climate change because the future of the planet also depends on their actions.

Engaging young people is important because they have the energy, creativity and determination to bring about meaningful change.

The workshop is carried out as part of the Don't call it change (DOCC) project, in partnership with YouNet APS (Italy), Organosi Gi (Greece), European Association World - Our Home (Latvia) and Dolnoslaska Federacja Organizacji Pozarządowych (Poland).

Project financed by the European Union, through the Citizens, Equality, Rights and Values (CERV) program.



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What is the climate crisis?



Climate crisis is a term that describes global warming, climate change, and its consequences.



The term has been used to describe the threat of global warming to the planet and to advocate for accelerating efforts to mitigate climate change.



The effects of climate change are sometimes described in terms similar to climate CHANGE, such as:

- **"climate catastrophe"** (used in reference to a documentary made by David Attenborough in 2019 and the 2019–2020 Australian bushfire season)
- **"climate emergency"** (11,000 warning letters from scientists in BioScience, and The Guardian, both 2019)
- **"global warming"** (Richard A. Betts, Met Office UK, 2018)





Climate change has a direct impact on the younger generation and can affect the environment, economy and quality of life. And yet...how can young people get involved?



- **Education and awareness** – a first step is to learn about climate change and share the knowledge with family, friends and the communities where they come from.



- **Civic engagement** – participation in movements promoting action to combat climate change.



- **Influence through social media** – young people can use their voice on social media platforms to draw attention to climate change and the need for immediate action.



- **Responsible consumption** – people can opt for sustainable, recyclable products and support brands and companies that have sustainable practices.

What are the causes? climate change?

The main causes of climate change are related to human activities and their impact on the global climate system. Among the most important causes are:

Greenhouse gas emissions: One of the main causes of climate change is the excessive emission of greenhouse gases (GHG) into the atmosphere. The most common GHGs are carbon dioxide (CO₂), methane (CH₄), nitrogen oxide (NO_x) and perfluorinated hydrocarbons (HFCs). These gases form a "blanket" in the atmosphere, which absorbs heat and prevents it from dissipating, thus leading to global warming and major climate change.

Deforestation and land-use changes: Deforestation and land-use changes, such as the conversion of forests to agricultural or urban land, lead to the release of carbon stocks accumulated in vegetation and soil. These changes exacerbate the climate crisis, as forests play a crucial role in absorbing CO₂ from the atmosphere.

Plastic production and management: Plastic production, especially from petrochemical sources, is energy-intensive and can release greenhouse gases in the process. Also, improper management of plastic waste leads to its accumulation in the environment, which can affect ecosystems and biodiversity.

Industrial and transport pollution: Pollutant emissions from industry, power plants and road transport contribute to air quality deterioration and global warming.



Climate
CHANGE



POSSIBLE SOLUTIONS

- Combating climate change requires coordinated and sustained action at global, national, community and individual levels.
- Here are some key solutions to address this complex issue:



THE TRANSITION TO RENEWABLE ENERGIES



PROTECTING FORESTS AND RESTORING ECOSYSTEMS



SUSTAINABLE AGRICULTURE



SUSTAINABLE TRANSPORT



RESPONSIBLE CONSUMPTION



ENGAGING IN AWARENESS AND ACTION ACTIVITIES



PROMOTING THE CIRCULAR ECONOMY

THE EFFECTS OF CLIMATE CHANGES



RISING TEMPERATURES



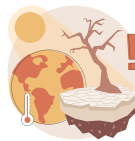
MELTING OF GLACIERS AND ICE CAPS



SEA LEVEL RISE



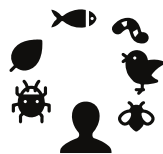
OCEAN ACIDIFICATION



EXTREME WEATHER PHENOMENA



LOSS OF BIODIVERSITY



CHANGES IN ECOSYSTEMS AND SPECIES DISTRIBUTION



CHANGES IN PRECIPITATION PATTERNS



THREATS TO AGRICULTURE AND FOOD SECURITY



IMPACT ON HEALTH



1

RISING TEMPERATURES



They have increased steadily over the last century due to the increased greenhouse effect. This leads to more frequent and more intense heat waves, which poses a health risk to vulnerable populations and puts pressure on ecosystems and agriculture.

Global average temperatures have risen significantly since the industrial revolution, and the last decade (2011-2020) was the warmest decade on record. Of the 20 warmest years, 19 have occurred since 2000.

Today, the global average temperature is **0.95 to 1.20°C** higher than at the end of the 19th century. Scientists believe that a **2°C** increase over pre-industrial levels represents a threshold with dangerous and catastrophic consequences for the climate and environment. This is why the international community agrees that global warming must remain well below a **2°C** increase.

The concept of average annual temperature for the entire globe may seem strange. After all, right now, the highest and lowest temperatures on Earth are probably more than **55°C** apart.



SOME RECORD TEMPERATURES



In the last 69 years, in **Romania**, the highest temperature was recorded in July 2007, which was **42.6°C**.

At the opposite pole, the coldest day was in January 2017 in Sibiu, when the thermometer dropped to **-29.0°C**.

In the last 74 years, in **Italy**, the highest temperature was recorded in August 1999, in Palermo Bocadifalco, the record temperature being **45.2°C**.

In March 2005, **-23.0°C** was recorded in Dobbiaco, the lowest temperature recorded in this time frame.



In the last 74 years in **Greece**, the highest temperature was recorded in August 2021 as **44.0°C**.

In January 2022, the lowest temperature of the same period was also recorded, i.e. **-10.0°C**.

In the last 72 years, in **Poland**, the highest temperature was recorded in March 2022, with a temperature of **37.4°C** reported.

In January 2021, the lowest temperature was also recorded, this being **-25.4°C**.



In the last 74 years, in **Latvia**, the highest temperature was recorded in July 2021, with a temperature of **33.7°C** reported.

Also in 2021, in February, the lowest temperature was also recorded, this being **-27.4°C**.



According to the World Meteorological Organization (WMO) and Guinness World Record, the highest global temperature was recorded in the USA in July 1913 as: **56.7°C**.

According to the World Meteorological Organization (WMO) and Guinness World Records, the lowest global temperature was recorded in Antarctica in July 1983 as: **-89.2°C**.





2

MELTING OF GLACIERS AND ICE CAPS

The Arctic and Antarctic are the "refrigerators of the world". Because they are covered in white snow and ice that reflect heat back, they balance out other parts of the world that absorb heat.

Less ice means less reflected heat, which means more intense heat waves around the world.

Climate warming has led to the accelerated melting of glaciers and ice sheets in the polar regions. This contributes to sea level rise, which can lead to coastal flooding and habitat loss for many species.



Vatnajökull Glacier Caves, Iceland



Melting glaciers have contributed to sea level rise of 2.7 centimeters since 1961. In addition, the world's glaciers contain enough ice - about 170,000 km³ - to raise sea levels by almost half a metre.



Also, the melting of glaciers will lead to the extinction of many species, as glaciers are the natural habitat of many animals, both terrestrial and aquatic.

EXAMPLES OF ANIMALS THAT ARE AFFECTED BY MELTING GLACIERS

polar owl



Bubo scandiacus

The arctic fox



Vulpes lagopus

polar bear



Ursus maritimus

The Imperial penguin



Aptenodytes forsteri

Walrus



Odobenus rosmarus

Reindeer

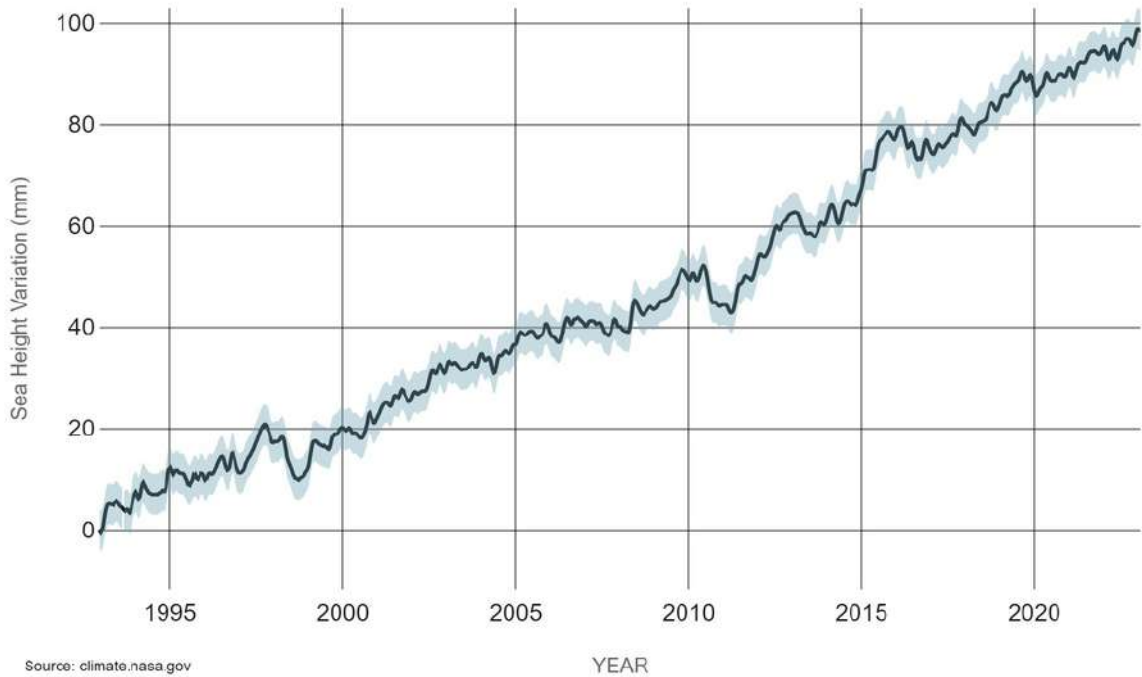
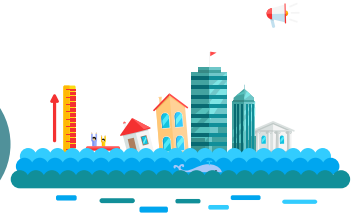


Rangifer tarandus



3

SEA LEVEL RISE



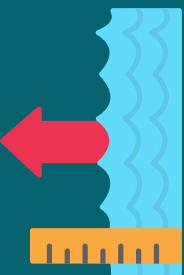
Sea level rise is mainly caused by two factors related to global warming:

- the addition of water from melting glaciers and ice sheets;
- the expansion of seawater as it warms.

The graph above tracks global sea level change since 1993 as observed by satellites.

Sea level rise poses significant risks to coastal communities, low-lying islands and valuable coastal ecosystems.





SEA LEVEL RISE



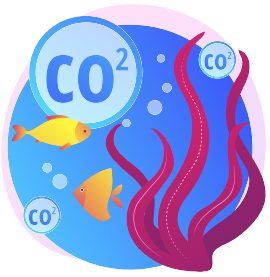
The most serious physical consequences of gradual sea-level rise on low-lying coastal areas are:
flooding and displacement of wetlands and low-lying areas;
coastal erosion;
increased vulnerability to coastal storm damage and flooding;
salinization of surface water and groundwater.

Coastal erosion is a natural process by which coastlines and shorelines are affected and eroded by the combined action of waves, water and wind. This phenomenon can also be accelerated by human intervention, such as the construction of dams, dykes, or irregular land development.

Coastal erosion is dangerous for several reasons:

- **Loss of beaches:** Erosion contributes to receding beach lines, which can affect tourism and the local economy.
- **Threat to infrastructure:** Buildings and infrastructure built near the shore become vulnerable and can be damaged or destroyed by waves and water.
- **Impact on ecosystems:** Coastal areas are often places of transit and with a rich diversity of marine and terrestrial species. Erosion can destroy or damage these habitats and affect local species.





4

OCEAN ACIDIFICATION

In the more than 200 years since the beginning of the industrial revolution, the concentration of carbon dioxide (CO₂) in the atmosphere has increased due to human activities. During this period, the pH of surface ocean waters dropped by 0.1 units.

This decrease might seem very small, but the pH scale is logarithmic, meaning that 0.1 represents about a 30% increase in acidity.

The pH scale ranges from 0 to 14, with 7 being neutral pH. Any pH greater than 7 is basic (alkaline) and any pH less than 7 is acidic.

The pH scale is the inverse of the hydrogen ion concentration, so a higher amount of hydrogen ions translates to higher acidity and a lower pH.



Impact of ocean acidification

Ocean acidification is already affecting many species in the ocean, especially organisms like clams and corals, which build their hard shells and skeletons by combining calcium and carbonate in the water.

Also, as acidification intensifies, available carbonate ions bind with excess hydrogen ions, resulting in fewer carbonate ions available to build shells, skeletons, and other calcium carbonate-based structures.

If the pH drops too low, the shells and skeletons may actually dissolve.

EXAMPLES OF SPECIES THAT ARE AFFECTED BY SEA AND OCEAN ACIDIFICATION

Sea urchins



Pacific oyster



Coral reef





5

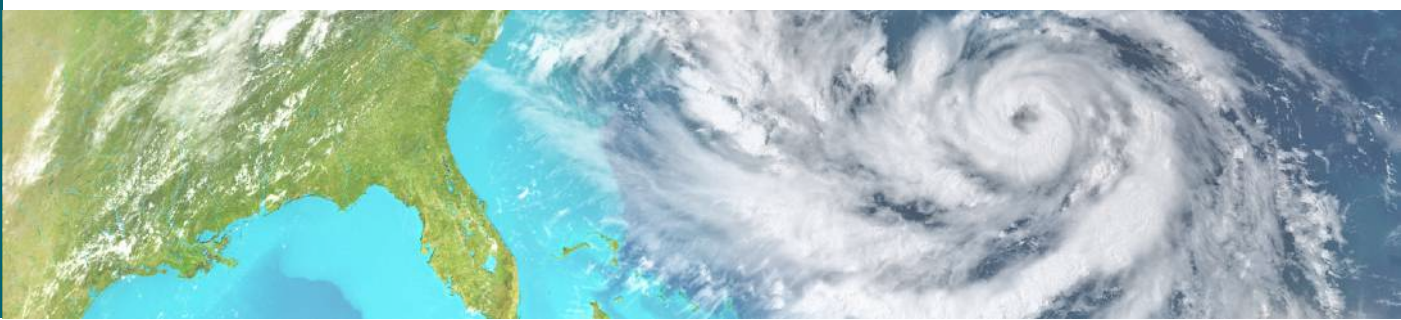
EXTREME WEATHER EVENTS

Climate change has been associated with an increase in the frequency and intensity of extreme weather events such as:

- hurricanes;
- cyclones;
- droughts;
- heat waves;
- blizzard;
- dust storms;
- hail storms;
- torrential rains.



These phenomena can cause extensive damage to infrastructure, agriculture and human settlements, displacing communities and affecting food and water security.





CONSEQUENCES OF EXTREME WEATHER EVENTS



Wildfires - heat waves often trigger extremely violent wildfires that affect entire communities, destroying homes and harming health through smoke inhalation. In addition, the impact on ecosystems is such that some never recover.



Floods - as temperatures rise, they cause more water to evaporate from land and oceans, changes in the amount and frequency of heavy rainfall can in turn affect the amount and frequency of floods. Low-lying lowland areas located near rivers, lagoons or lakes are prone to flooding when water levels rise. This phenomenon also applies to coastal areas, where seawater can be brought inland by strong winds, tides and tsunamis.



Climate migration - according to UNHCR, the UN refugee agency, an annual average of 21.5 million people were forcibly displaced each year between 2008 and 2016 due to extreme weather events.



Hunger and malnutrition - extreme weather events also have a negative impact on agriculture and food production, limiting in certain circumstances including access to food. Climate change also affects the nutritional values of food.



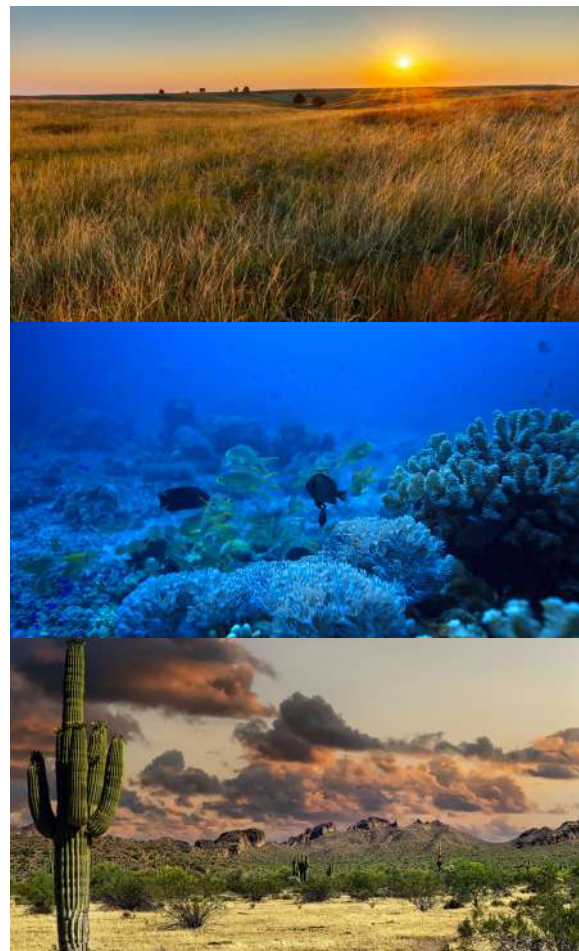
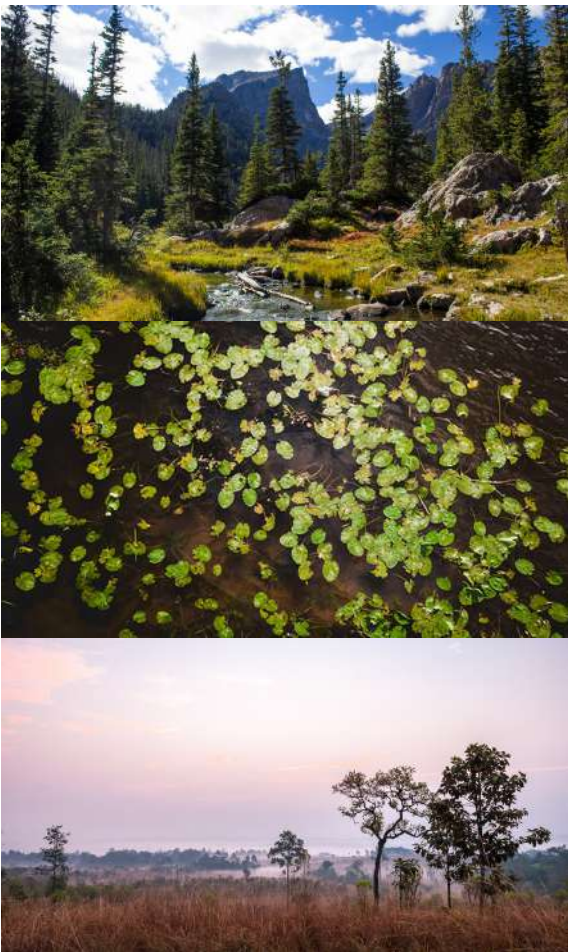
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LOSS OF BIODIVERSITY

First, it is important to define the term 'biodiversity'.

Biodiversity is the variety of life on Earth, including genes, species and ecosystems, and the ecological processes of which they are a part.

Terrestrial biodiversity is usually higher near the equator, as a result of a warmer climate and high primary production. Biodiversity is not evenly distributed on Earth and is richer in the tropics.





Different types of terrestrial and aquatic ecosystems

Why is biodiversity important?



Healthy ecosystems provide us with many essential things.

 Plants transform solar energy, making it available to other life forms.

 Bacteria and other living organisms break down organic matter into nutrients, giving plants a healthy soil in which to grow.

 Pollinators are essential for plant reproduction, guaranteeing our food production.

 Plants and oceans act as large carbon sinks.

In short, biodiversity offers us:

fresh air;

fresh water;

good quality soil;

pollination of crops.



It helps us combat and adapt to climate change and reduce the impact of natural hazards.

Because living organisms interact in dynamic ecosystems, the extinction of a species can have a far-reaching impact on the food chain.



Combating biodiversity loss

Combating biodiversity loss is a shared responsibility and requires the involvement and contribution of every person, community and every government globally.

Some of the key actions that can help protect and conserve biodiversity are:

- **Creation and management of protected areas:** The establishment of national parks, nature reserves and other protected areas is essential to protect the habitat of wild plants and animals.
- **Protecting natural habitats:** maintaining and restoring natural habitats, such as forests, marshes, wetlands and coral reefs, helping to protect native species.



Romania: 1550 protected areas.



Greece: 1249 protected areas.



Italy: 3512 protected areas.



Latvia: 1051 protected areas.



Poland: 3063 protected areas.



Retezat National Park, Romania



Gran Paradiso National Park, Italy



Olympus National Park, Greece



Wigry National Park, Poland



Gauja National Park, Latvia



Climate change is currently affecting at least **10,967** species on the IUCN **Red List of Threatened Species**.


Climate change has a significant impact on ecosystems and species distribution around the world. As global temperatures continue to rise and weather patterns change, ecosystems and species are adapting and responding in various ways.

This can disrupt ecological interactions and lead to the proliferation of invasive species, further affecting local biodiversity.

Some ways climate change affects ecosystems and species distribution:

Changes in species distribution: As global temperatures rise, certain regions may become more favorable for some species and others may be pushed to cooler areas. Species that can adapt and move quickly have a better chance of survival in the new climate. However, some species, especially those with reduced mobility, may have difficulty coping with the new conditions and may be at risk of extinction.





Changes in breeding and migration cycles: Climate change can affect the breeding cycles and migration of species. Some species may be pushed to change their breeding behavior or migrate earlier or later in the year to find the resources they need.

This can lead to desynchronization of interactions between species, such as the relationship between predators and prey or pollinators and plants.

Changes in habitat: Climate change can affect the availability and quality of habitats. In rapidly warming areas, certain types of ecosystems, such as tundra or ice areas, may shrink or even disappear entirely.

These changes can lead to the loss of critical habitats for some species and put pressure on the resources available for survival.

Vulnerability of fragile species and ecosystems: Certain ecosystems, such as coral reefs, rainforests or mountain regions, are more sensitive to climate change and can be affected more quickly.

Species living in these ecosystems may be vulnerable to climate change and may be at risk of extinction.





8

CHANGES IN PRECIPITATION PATTERNS

Heated by solar radiation, the surface of the ocean and land evaporates water, which is then carried by wind into the atmosphere, condenses to form clouds, and then falls back to the Earth's surface as rain or snow, and the flow to the oceans, through rivers, completes the global hydrological (water) cycle.

Precipitation varies from year to year and over decades, and changes in amount, intensity, frequency, and type (eg, snow vs. rain) affect the environment and society.

Climate change can alter rainfall patterns, causing some regions to experience more intense rain and flooding, while others experience prolonged droughts.

World agriculture, especially in the Third World, depends on the seasonal pattern of rainfall. Recent erratic changes in the rainfall regime lead to low agricultural production, thereby creating food insecurity for an ever-increasing world population. Floods, drought and famine are the consequences of these regime changes.





EXAMPLES OF CHANGES IN PRECIPITATION PATTERNS

Increased intensity of rainfall: In some regions, an increase in the intensity of rainfall has been observed. This means that when it does rain, the rain tends to fall in stronger bursts, leading to a greater risk of flash flooding and soil erosion.

Changes in seasonal rainfall: There are also changes in the timing of seasonal rainfall. For example, in some regions the monsoon or rainy season may occur earlier or later.

Longer periods of drought: Some areas experience longer periods of dry weather between rainfall events. This can lead to drought conditions, with impacts on agriculture, water resources and ecosystems.

Expansion of arid regions: Some areas that were once relatively humid are experiencing increased aridity, leading to desertification and a decrease in plant cover.

More frequent and more intense storms: Climate change has been associated with an increase in the frequency and intensity of tropical storms, hurricanes and typhoons. These extreme weather events can bring torrential rains, leading to widespread flooding and destruction.

Melting polar ice: In the polar regions, precipitation patterns are changing due to melting ice and increased evaporation due to warming seas. This can lead to changes in the availability and distribution of freshwater resources.



Climate change is a significant threat to agriculture and food security worldwide.

Their impact on the agricultural sector can be felt in the following ways:

Decrease in agricultural production: Climate change can lead to changes in rainfall patterns, droughts, floods and extreme temperatures. These adverse conditions can reduce agricultural production and affect crop quality.



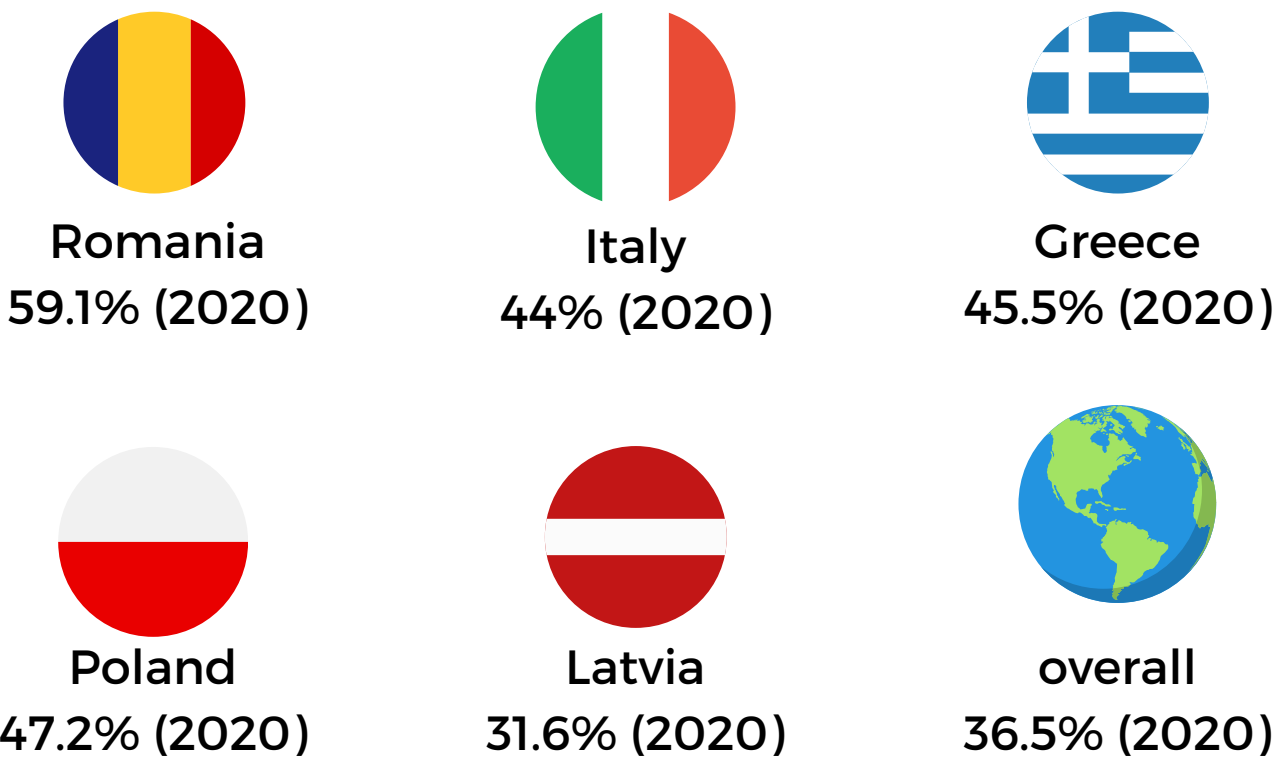
Agricultural crops such as wheat, rice, maize or potatoes are sensitive to climate change and may produce lower yields, putting pressure on the food supply.

Shifting of crop areas: Climate change can cause changes in temperatures and precipitation, which can lead to migration of crop areas. This may result in the need to adjust agricultural practices or migrate crops to more favorable regions, which may be difficult or costly for farmers.



Decreased soil quality: Rising temperatures and changes in precipitation can affect soil quality by reducing moisture and nutrient content. Poor soils can lead to lower crop yields and greater reliance on fertilizers.

AGRICULTURAL LAND (% OF AREA)



SOURCE: [HTTPS://DATA.WORLDBANK.ORG/INDICATOR/AG.LND.AGRIZS?LOCATIONS-LV](https://data.worldbank.org/indicator/AG.LND.AGRIZS?locations-LV)



10

IMPACT ON HEALTH

Climate change affects social and environmental determinants of health:

- fresh air;
- drinking water;
- enough food;
- safe shelter.

Climate change is already impacting health in a multitude of ways, including by leading to:

- injuries and deaths caused by phenomena extreme weather;



- diseases caused by heat waves;

- respiratory diseases;



- waterborne diseases;



- zoonoses;



- vector-borne diseases;



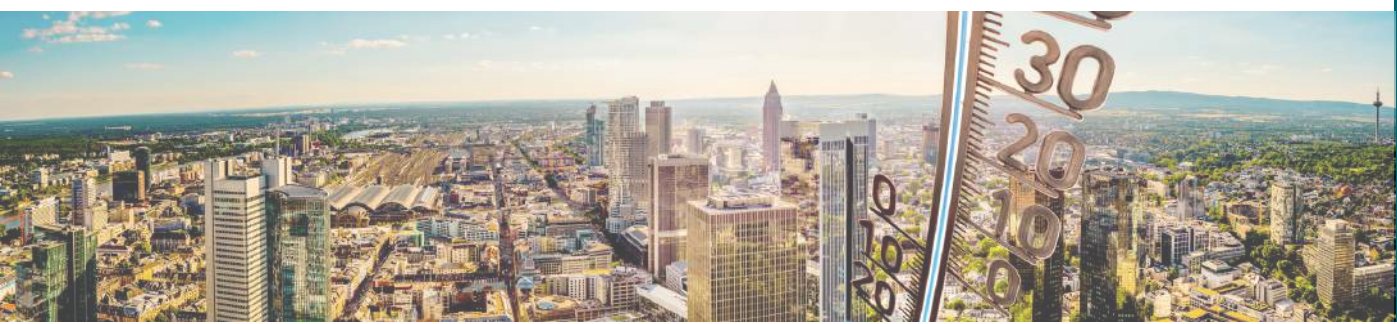
- malnutrition and eating disorders;



- non-contagious diseases;



- affecting mental and psychosocial health.





Research has shown that climate change may worsen 58% of infectious diseases that people come into contact with worldwide, from common waterborne viruses to deadly diseases such as the plague; 77,000 studies were analyzed for the research.

Flooding, for example, can spread hepatitis. Rising temperatures can extend the lifespan of malaria-carrying mosquitoes. Droughts can bring hantavirus-infected rodents into communities as they forage.

Four key ways in which climate threats interact with pathogens and humans have been discovered:

1) Climate-related hazards bring pathogens closer to humans.

In some cases, climate-related hazards alter the range of animals and organisms that can act as vectors for dangerous pathogens.

For example, warming or changes in precipitation patterns can alter the distribution of mosquitoes, which are vectors of many human-pathogenic diseases. In recent decades, geographic shifts in the outbreaks of mosquito-borne diseases such as malaria and dengue have been linked to these climate hazards.





2) Climate-related hazards bring humans closer to pathogens.

Climate disasters can also alter people's behavior patterns in ways that increase the chances of them being exposed to pathogens. For example, during heat waves, people often spend more time in water, which can lead to an increase in outbreaks of waterborne diseases.

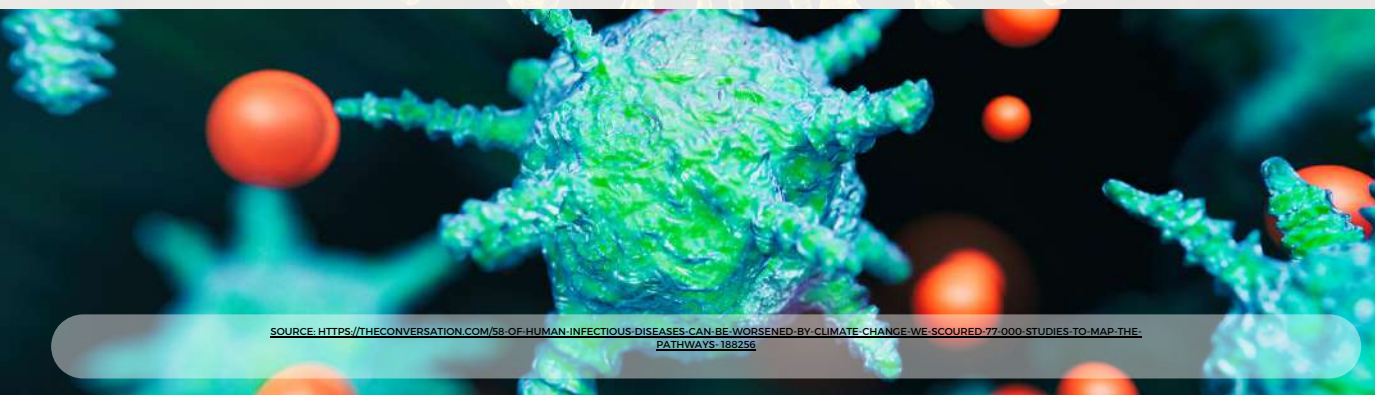
3) Climate-related hazards increase pathogens.

In some cases, climate-related hazards have led to either environmental conditions that may increase opportunities for pathogens to interact with vectors, or to increase the ability of pathogens to cause serious disease in humans. For example, standing water left behind by heavy rainfall and flooding can provide breeding grounds for mosquitoes, leading to increased transmission of diseases such as yellow fever, dengue, malaria, West Nile and leishmaniasis.

4) Climate-related hazards weaken the body's ability to deal with pathogens.

Climate-related hazards can affect the human body's ability to cope with pathogens in two key ways. They can force people into dangerous conditions, such as when disaster damage causes people to live in cramped conditions that may lack good sanitation or increase their exposure to pathogens .

Hazards can also reduce the body's ability to fight pathogens, for example through malnutrition. Living in climate hazard conditions can also induce an increased production of cortisol due to stress, which leads to a reduction in the immune response of the human body.



What does our organization do?



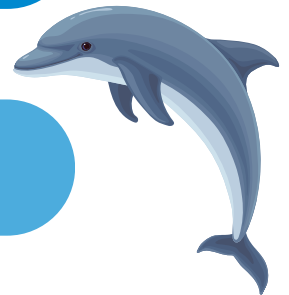
We are the most active environmental NGO in Constanta. Since 1994, we have been increasing respect for the environment, annually developing projects to help Constanța become a truly European city.

We always carry out activities that include:



Education for sustainable development

Conservation of marine and coastal biodiversity



Monitoring of marine waste in the Romanian coastal area



Public events



Volunteering





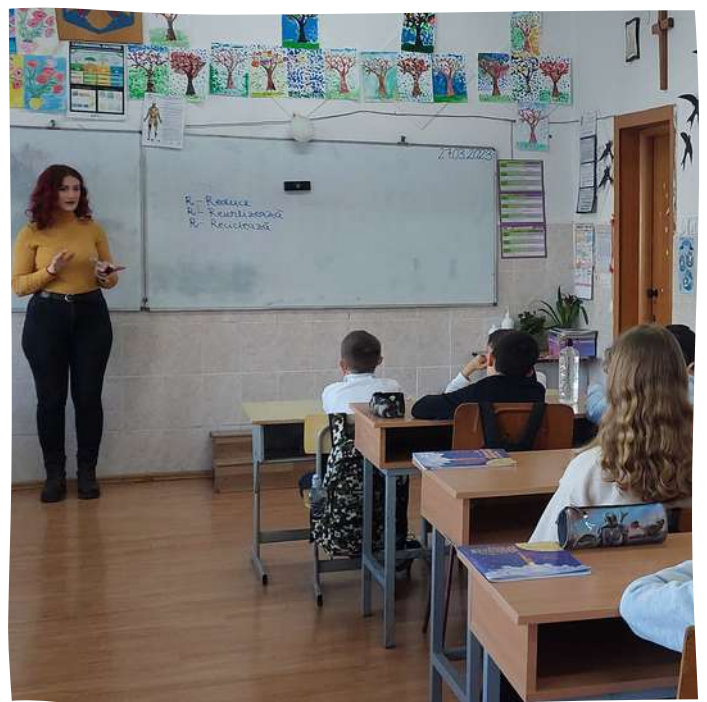
Education for sustainable development

Change always comes with effort, and this effort is called EDUCATION FOR SUSTAINABLE DEVELOPMENT, the most powerful mechanism/tool to save the Black Sea ecosystem and conserve biodiversity, but not only.

Education for Sustainable Development is a vast concept, which includes environmental, social, economic and good governance aspects, and which Mare Nostrum has mastered for more than 20 years.

Every action we take is built to educate sustainably. It is a sustained effort that brings equally lasting results.

Every day we educate people, big and small, to change destructive behaviors towards the environment. We are building a generation of "world changers", who will be an example for Romania and Europe



Conservation of marine and coastal biodiversity

Our organization has the largest database of dolphins observed, as well as those stranded on the Romanian coast.

Over time, we have conducted several types of dolphin monitoring:



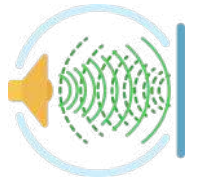
AIR

water



LAND

ACOUSTIC



There are 3 species of cetaceans in the Black Sea:



Common dolphin



Delphinus delphis (ssp. ponticus)

Bottlenose dolphin



Tursiops truncatus (ssp. ponticus)

Harbour porpoise



Phocoena phocoena (ssp. relicta)





Monitoring of marine waste in the Romanian coastal area

Marine litter is a huge problem in our oceans, with some scientists warning that by 2050, there will be more plastic in the oceans than fish.

Both macroplastics and microplastics persist in the marine environment and have harmful effects on marine life and biodiversity, as well as negative effects on human health. In addition, marine plastic litter has a negative impact on activities such as tourism, fishing and shipping.

Mare Nostrum NGO carries out **3 annual monitoring** of marine waste from the Romanian coastal area, according to the European methodology.

From April 2014 until now we have removed approximately **223,000** pieces of waste, mostly plastic.





Public events

Public events, which have become a tradition for us, are the perfect opportunity to bring before the general public the problems that the environment encounters on a daily basis. Through these events we make our mission and vision known, each time bringing our message to the attention of the local and national public.

The 4 big events we hold annually are:

- **Earth Hour** - Since March 2012, Mare Nostrum NGO participated in EARTH HOUR, along with hundreds of countries, turning off the lights in Constanța. The aim being to raise awareness of the authorities and consumers regarding CO2 emissions during the production of electricity.
- **Green Week** - Annual international event, which Mare Nostrum NGO marks with environmentally friendly activities in the first week of June.
- **Dolphin Day** - Dolphins in the Black Sea are a very important topic for the Mare Nostrum NGO, and since 2001 we have brought to the attention of the general public the problems they face and the importance of protecting them through the Dolphin Day event.
- **International Black Sea Day** - Since 1997, together with the countries bordering the Black Sea, we have been marking and engaging the community in solutions for the marine ecosystem, emphasizing the importance of bottom-up change.





Volunteering

Volunteering at Mare Nostrum means dynamism, passion and the desire to change the world for the better. We have, in our team of volunteers, dedicated, motivated and hardworking people.

Our activities are sometimes demanding, require effort and energy, always with a smile on your face, fun and collegiality. We like to say that our volunteers are "world changers" and we strongly believe in their strength and optimism.

At the end of July 2023, our volunteers have collectively accumulated more than **1,200** working hours.



Final note

Dear participant,

The information in this material is only a small part of what the problems that climate change is causing our planet really mean.

The material has been created to give you only some essential information about the climate crisis, but the key point of this workshop will be your contribution, yours and the other participants. We want to hear your views, understand your fears and dreams about our collective future. In the debates that will take place, we will explore diverse ideas and look for creative solutions to protect the environment.

We were delighted to hear that you are interested in taking part in our workshop on this important topic. Each of us plays an important role in the fight to protect the planet and ensure a sustainable future for generations to come.

We encourage you to be open, prepare your arguments and express your thoughts freely. Until then... we look forward to meeting you at the workshop and starting a positive change.

With love and enthusiasm,
Mare Nostrum NGO team

