

# CLIMATE SPEAKERS

Trainees' Handbook

1 PLANET  
4 ALL



2020

# CLIMATE SPEAKERS

## Trainees' Handbook

JOSÉ AZEVEDO (COORD.)  
ANA SOFIA MAIA  
IVONE NEIVA SANTOS

Implemented by:



Partners:



Funded by:



## ABOUT THIS MANUAL

04

## INTRODUCTION

07

# 1.

## SCIENTIFIC BASIS

09

Climate vs. Weather

09

Climate system

11

The importance of climate

12

# 3.

## IMPACTS

20

Impacts on natural ecosystems  
and biodiversity

21

Impacts on human health  
and the economy

22

Disproportionate impacts  
worldwide

23

# Part I.

## CLIMATE CHANGE

08

# 2.

## CAUSES

13

Why is climate changing?

13

The greenhouse gas effect

14

Greenhouse gases

15

Sources of greenhouse  
gas emissions

15

Albedo

18

# 4.

## CLIMATE ACTION

27

Mitigation and adaptation

27

The climate agenda's origins

29

National climate change  
programmes

34



# 1.

## RELEVANCE IN TODAY'S SOCIETY 37

- The emergence of the climate change communication 37
- Media literacy 38
- Communication challenges 39
- Environmental communication in times of a pandemic 40

# 3.

## COMMUNICATION STRATEGIES 47

- Communicating scientific and climate uncertainties 48
- Climate denial 50
- Managing emotional aspects 52
- Emphasize scientific rigor 53
- Communicate in a humanized way 54
- Conveying motivational messages 55

# Part II.

## COMMUNICATION ON CLIMATE CHANGE 35

# 2.

## PUBLIC PERCEPTIONS AND ENGAGEMENT WITH CLIMATE CHANGE 42

## BIBLIOGRAPHY 56

## CHARTS INDEX 58



# ABOUT THIS MANUAL

The Climate Speakers programme was developed under the European project 1Planet4All – Empowering youth, living EU values, and tackling climate change. The programme’s purpose is to awaken young people’s awareness and critical understanding of Climate Change as a global threat to Sustainable Development, as well as to promote their involvement in concrete actions on climate change. This programme is based on a ‘snowball’ approach. A first group of participants will be provided with the necessary tools and knowledge to work with a wider group, who, in turn, will also have an extended intervention in the community to which they belong.

This manual was prepared for Climate Speakers programme participants, with the aim of integrating climate change subjects and sharing educational materials. This is the structure for the activities planned: a first part dedicated to presenting the current climate change scenario (challenges/evidence/consequences/solutions); and a second part reflecting on the role of media in the dissemination of climate change issues, as well as their communication strategies.

This manual has been produced under the European project 1Planet4All – Empowering youth, living EU values, tackling climate change, with financial support from the European Union. Its contents are the sole responsibility of its authors and do not necessarily reflect the views of the European Union. In Portugal the 1Planet4All project is implemented by VIDA in partnership with Faculty of Arts and Humanities of University of Porto and 2adapt, and funded by the European Union and Camões, I.P.







# INTRODUCTION

Climate change is currently an undeniable and politically urgent global reality, the main cause being greenhouse gases from human activity. They constitute not only an environmental problem, but also a humanitarian and developmental emergency with global repercussions, disproportionately affecting countries in the Global South – the poorest and most vulnerable population sectors. These countries are the ones who have the least historical responsibility for climate change and have less capacity to respond and adapt.

Although characterised by physical manifestations, climate change is presented to people through different channels: news on television, photographs on non-governmental organisation's websites, graphics in a newspaper, among other examples. Thus, the media take on an important role in raising public awareness for more sustainable actions, by mediating and disseminating knowledge about the phenomenon.

However, communication about the occurrences and causes is not enough to engage the population to adopt behaviours and practices that are less harmful to the environment. It is also necessary to understand to which extent communication strategies can contribute to a better message construction on the climate change issue. The urgent need for effective communication (results-oriented) is now essential for increasing policies that support and contribute to the adapting and lessening the effects caused. People take a leading role in transforming the current scenario. Therefore, communication with the purpose of promoting more sustainable behaviours and generating involvement with the issue has become a conditioning factor for the necessary changes.

# PART I.

## CLIMATE CHANGE

Climate can be defined in terms of the average and variability of meteorological parameters, such as temperature, precipitation, and wind, over a period ranging from months to thousands or millions of years. It reflects long-term weather variations, and as such, climate and weather should be differentiated.

Meteorological conditions, such as the annual average temperature on the Earth's surface, change throughout history. Small changes can result in ice ages or warm periods. Over the past century, an increase in the Earth's average surface temperature of about + 0,76°C has been observed.



There are several natural factors that can influence climate, such as changes in the Earth's orbit around the Sun, volcanic eruptions or even periods of increased or decreased solar activity. However, the current warming trend we face is mainly the result of an increase in the concentration of greenhouse gases (GHGs), such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), which retain heat in the atmosphere.

The 2007 Intergovernmental Panel on Climate Change (IPCC) Assessment Report confirms that climate change is unequivocal and stems from human activity (also known as anthropogenic activity) that have been increasing since the beginning of the Industrial Age (around 1750). These activities include, among others, the burning of fossil fuels (coal, oil, and gas), deforestation, and agricultural practices that consequently increase the concentration of GHGs in the atmosphere.

Climate change impacts are already visible nowadays, in deglaciation, increased frequent extreme weather events such as droughts, cyclones or heavy rains, rising sea levels, and changes in plant growth affecting agriculture and food production. These and other observed changes are expected to intensify and cause significant impact on human societies and the environment, especially if no effort is made.

# 1.

## SCIENTIFIC BASIS

### Climate vs. Weather

To define 'climate', it is important to know how to distinguish its meaning from the concept of 'weather'. The weather we experience daily is a momentary atmospheric state characterised by temperature, precipitation, wind, humidity, and other meteorological parameters. It can vary irregularly, following no specific pattern. When longer periods are considered, weather can vary recurrently, whether on a global, regional, or local scale. This process is called climate.

In contrast to the instantaneous weather conditions, climate is represented by average values (e.g. average annual temperature), but also typical variability (e.g. seasonal maximum/minimum temperatures) and frequency of extreme events, such as hurricanes/cyclones. The climate is not experienced on a day-to-day basis. Typically, the time scale on which climate statistics are calculated is thirty years (e.g. 1981-2010).





## FACTORS THAT INFLUENCE WEATHER



### TEMPERATURE

Degree of heat present in the air at a specific place and time.



### WIND

Air mass movement in the atmosphere.



### ATMOSPHERIC PRESSURE

Force exerted by the air on the earth's surface.



### CLOUDS

Drops of liquid or ice water in suspension.

## FACTORS THAT INFLUENCE CLIMATE



### ALTITUDE

Vertical distance that exists between a point on the earth and sea level. The higher it is, the cooler the climate.



### OCEAN CURRENTS

Directed movement of water due to the action of wind, tides, and density differences.



### LATITUDE

Distance that separates a certain place from the earth's equator. The closer to the equator, the warmer the climate.

## Climate system

Earth's climate state is determined by the amount of energy stored by the climate system and especially by the balance between the energy received from the Sun and the portion of this energy that the Earth releases back into space. This global energy balance is essentially regulated by energy flows within the global climate system.

Heat moves around the Earth through the global climate system, which comprises the atmosphere, oceans, ice sheets, the biosphere (all living organisms) and soils, sediments, and rocks. The climate system is made up of subsystems, in which several processes take place. These complex interactions result in intermittent and ever-changing events.

**El Niño**, or ENSO, is a weather pattern that occurs in the tropical Pacific Ocean approximately every five years. It is characterised by variations in the surface temperature of the tropical eastern Pacific Ocean – warming or cooling variations respectively known as El Niño and La Niña – and surface air pressure in the western tropical Pacific – the southern oscillation. ENSO causes extreme weather conditions (such as floods and droughts) in many regions of the planet. The frequency and intensity of ENSO are potentially subject to drastic changes as a result of global warming.

The direction and strength of the westerly winds in Europe are controlled by a permanent low pressure system over Iceland (the Icelandic Low) and a permanent high pressure system over Azores (the Azores High). These systems' relative strengths and positions vary from year to year and this variation is known as the **North Atlantic Oscillation**.

## **The importance of climate**

Climate is extremely important for our planet.

## **Food and climate**

There are many factors related to food production, one of them being needing favourable climate conditions for crops and animal husbandry. For example, if the climate is too dry, certain crops will not receive the necessary amount of water making it impossible for them to grow. Farmers all over the world earn their livelihoods from crops and livestock. This process depends on their strong understanding of the local climate and natural environment. Any unexpected changes can have serious effects on businesses and incomes.

More than 80% of total agriculture is 'rainfed'. In Latin America, this figure goes up to almost 90% and in Africa all the way to 95%. This means that these systems are completely dependent on rainfall for crops to grow, lacking irrigation systems of their own.

## **Climate and health**

Certain diseases such as malaria and dengue, transmitted by mosquitoes, spread much more easily in hot, humid, and rainy climates. People can also suffer from heat stroke and dehydration in very hot climates. Consequently, climate change can have a major effect on health – climate change

may contribute to an increase in extreme weather events such as hurricanes, floods and droughts that are often harmful to humans and other living organisms.

## **Climate and biodiversity**

Over time, animals and plants have adapted and evolved to survive the climate in which they live. Camels can last a week or more without water and can survive several months without food – a strength that is essential in the arid desert. Some lizards have extra thick skin that prevents it from drying out in the hot desert sun. At the other end of extremes there are certain species (like frogs) that can partially 'freeze' during winter to survive. In spring, they 'thaw' and come back to life. However, these types of adaptation occurred over long periods of time in Earth's history, when the climate changed slowly. Currently, climate change is happening so fast that species may not be able to adapt which can lead to extinctions. This is especially true when talking about species already weakened by other threats such as habitat destruction and pollution.



# 2.

## CAUSES

### Why is climate changing?

Climate change is currently an undeniable and politically urgent global reality. These changes predate the emergence of human species and have marked various periods in the history of the planet with global warming and cooling. Its natural cause is essentially due to regular variations in the Earth's orbit around the Sun, which change the amount of solar energy that reaches the planet. It is thought that an ice age is triggered when solar energy reaching the northern hemisphere in summer falls below a certain critical value due to orbital cycles, and the snow from the previous winter does not melt, leading to a growth and advance of glaciers (IPCC 2007).

However, since the mid-19th century, after the Industrial Revolution, these changes have accelerated and worsened, leading scientists to question the impact of human actions. In practice, laboratory models reveal that considering only known natural origins is not enough to explain the temperature change in the lower atmosphere. Anthropogenic sources need to be included in these models to bring the results closer to the average values recorded by all meteorological stations worldwide.

According to the United Nations Framework Convention on Climate Change, signed at the United Nations Conference on Environment and Development or 'Earth Summit' (Rio de Janeiro, 1992), 'Climate change' means a modification in the climate attributable directly or indirectly to human activity, which changes the composition of the global atmosphere. Climate change, when combined with climate's natural variations, can be observed over comparable periods of time.



## The greenhouse gas effect

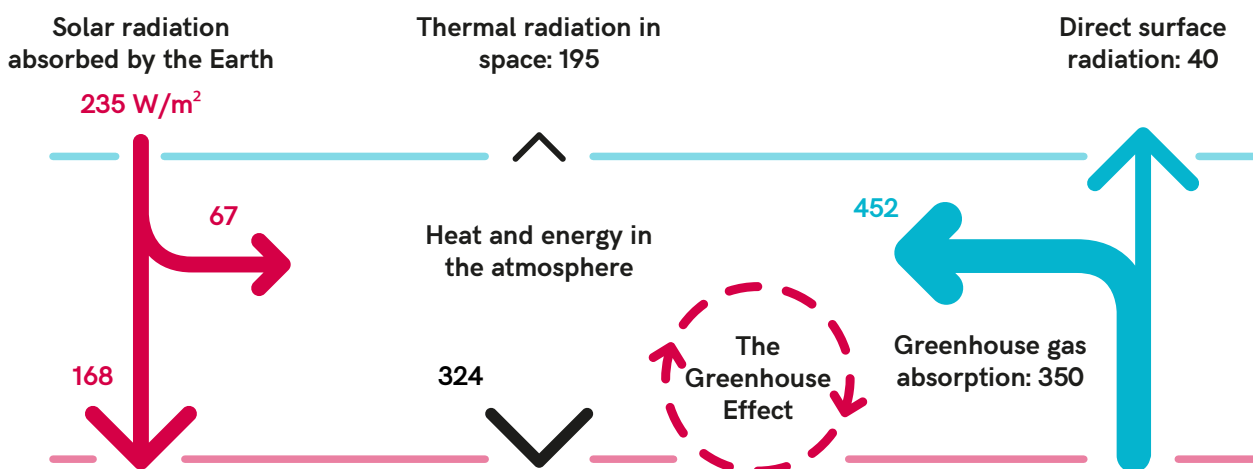
The main cause of climate change is due to an increase in the so-called Greenhouse Gases (GHG), currently emitted in production processes (industrial and agricultural), transport, and consumption.

In fact, greenhouse gas concentration plays a crucial role in the atmosphere's radiation balance. Without GHGs, the Earth's surface would radiate directly into space. The infrared radiation would not be absorbed by the atmosphere and the atmosphere would not emit energy towards the surface. In a situation like this, the atmosphere's average global surface temperature would be  $-18^{\circ}\text{C}$  (degrees Celsius) instead of the current  $15^{\circ}\text{C}$ . This difference is the result of a natural greenhouse effect that decisively improves the planet's habitability.

However, if greenhouse gas concentration in the atmosphere builds up, heat will be trapped. The phenomenon of a rise in the earth's average temperature is called global warming.

Currently, there is a very broad consensus in the international scientific community that human activities are causing climate change by releasing greenhouse gases into the atmosphere, particularly  $\text{CO}_2$ .

Chart 1. Greenhouse effect



## Greenhouse gases

The main greenhouse gases emitted from human activity do not contribute equally to global warming, both in terms of the volume released and the different potential impact they have on global warming. The GHGs included in the Kyoto Protocol are:



## Sources of greenhouse gas emissions

Various physical and biological systems emit greenhouse gases. There are 'natural' sources of greenhouse gases, such as volcanoes, soils, oceans, marshes, wetlands, and the decomposition of living organisms. But as the world's population and economies grow, more greenhouse gases are released into the atmosphere. Here's a look at which human activities have the greatest impact nowadays.



## **ELECTRICITY**

Governments are not the only ones responsible for the problems in the energy sector. Since the beginning of the industrial age, it is estimated that almost 2/3 of GHG emissions produced by human activity are caused by less than a hundred companies. The vast majority are producers of oil, gas, and coal.



## **FOOD PRODUCTION**

Intensive farming of animals for food consumption, deforestation, and agricultural production of animal feed (cereals, etc.), all strongly contribute to GHG emissions. Meat and dairy are the food products with the largest global carbon footprint as well as raw material and water consumption per kilogram, with their emissions increasing globally. Furthermore, food waste, which starts during production and continues through to distribution and storage in supermarkets and restaurants, contributes to 6.7% of global emissions.



## **INDUSTRY**

About 51% of the world's energy is used in the industrial sector. This covers manufacturing (e.g. factories producing electronics, textiles and other household goods), agriculture, mining, and construction. Energy-intensive industries include those working with chemicals, metals (such as iron and aluminium), minerals, paper, food processing, as well as coal, oil, and natural gas mining. Another example is the fashion industry, which is based on non-renewable resources, such as the oil used in the production of synthetic fibres, the fertilisers used in cotton production, or the chemicals used in the production process for dyeing and finishing fibres and textiles. These processes have a significant bearing on climate change.



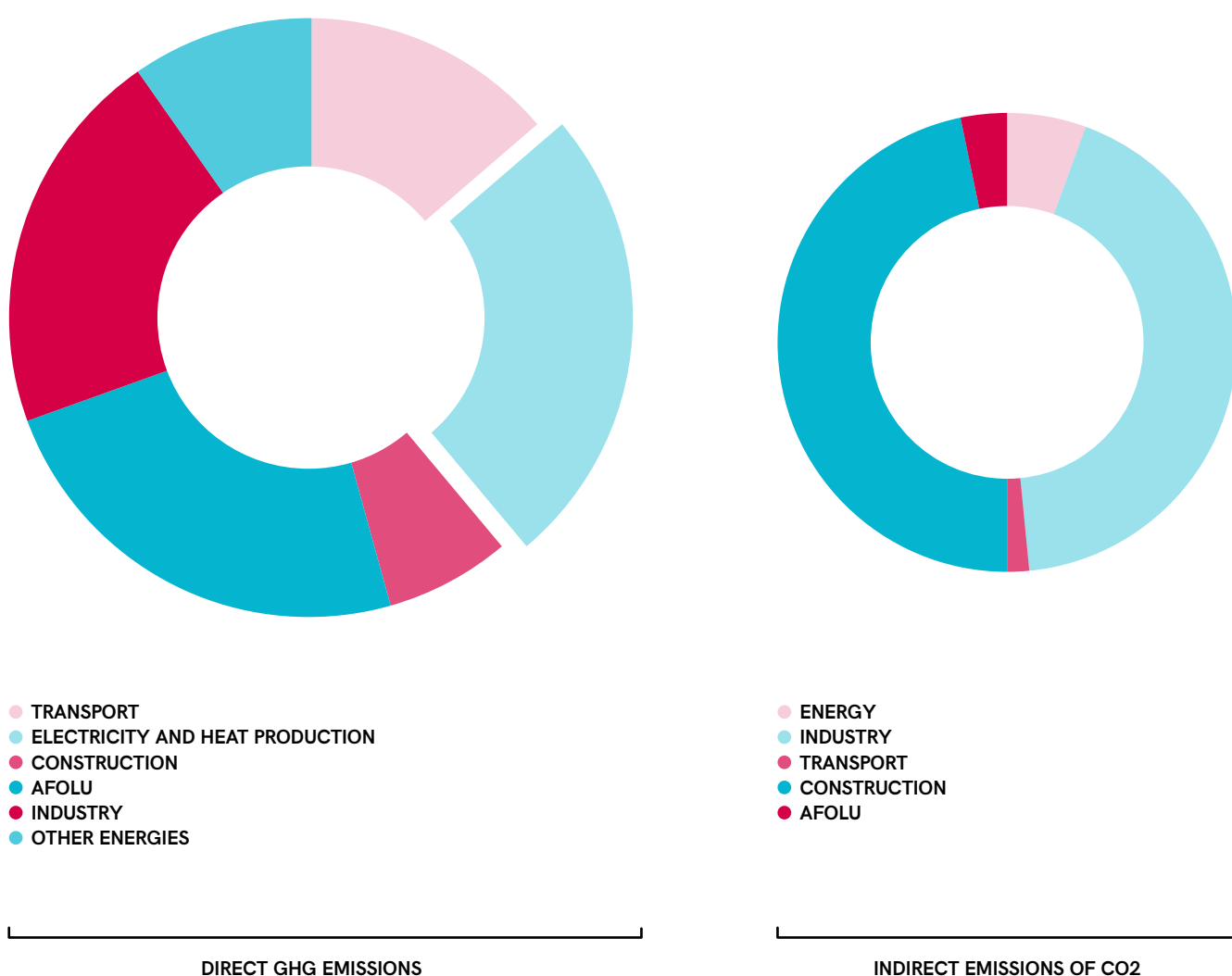
## **TRANSPORT**

Perhaps the most visible source of emissions comes from transport. People are travelling more frequently and using more energy-intensive modes of transport, such as planes and cars rather than trains and bicycles, exacerbating the negative impact on the environment. In addition, globalisation is increasing trading and circulation of more products and goods around the world.



The next graphs bring together the percentages corresponding to human-caused greenhouse gas emissions, by economic sectors, in 2010 (IPCC, 2014). Indirect CO<sub>2</sub> emissions from electricity and heat production are attributed to energy end-use sectors. 'Other energy' refers to all sources of GHG emissions in the energy sector except electricity and heat production. Emissions data on agriculture, forestry, and other land uses (AFOLU) include terrestrial CO<sub>2</sub> emissions from, for example, forest fires. Fires both affect direct and indirect greenhouse gas emissions.

**Chart 2. Greenhouse gas emissions by economic sectors**



**Source:** IPCC (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

## Albedo

The albedo effect represents the amount of light (solar radiation) reflected by a surface, usually expressed in percentages (IPCC, 2014). When applied to planet Earth, it measures how much energy coming from the Sun is reflected back into space. Each surface has a specific effect on the Earth's temperature. Snow and ice reflect a great part of the Sun's energy back into space, so they have a high albedo. Oceans, on the other hand, have a low albedo, because they are darker, and absorb energy. As they absorb a lot of heat (about 90%), they help to keep the Earth warm. This warming increases the amount of water vapour in the atmosphere, acting as a greenhouse gas. In addition, the term albedo can also be used for man-made structures. Energy-efficient building design takes albedo into consideration, namely, to choose between a dark or light cladding of a wall, or if a rooftop warms the building or keeps it cool. The Earth's planetary albedo changes mainly through variations in cloud cover, snow, ice, leaf area, and changes in land cover.

The Earth's average surface temperature, due to its albedo and the greenhouse effect, is currently 15 °C. If the Earth froze completely (thus becoming more reflective), the average temperature of the planet would be less than -40 °C. If only the continental land masses were covered by glaciers, the average temperature of the planet would drop to 0 °C. On the other hand, if the entire Earth were covered by water, the average temperature of the planet would rise to around 27 °C. Considering that we have been witnessing the melting of the polar ice caps, the tendency will be for less energy to be reflected and more to be absorbed, thus favouring global warming. But it is not only melting ice that has reduced the albedo effect. Greenhouse conditions can also alter the Earth's albedo. As more infrared radiation is captured, due to the increased number of greenhouse gases in the atmosphere, less energy is reflected. Since the greenhouse effect can decrease the Earth's albedo, and a change in albedo can result in a change in the Earth's equilibrium temperature, it can be concluded that albedo can contribute to climate change.



## **WHAT IS THE DIFFERENCE?**

Global warming describes the current increase in the Earth's temperature. It is a characteristic of climate change.

Climate change refers to different effects of global warming on the Earth's climate system. These include rising sea water levels, melting glaciers, changing rainfall patterns, increased extreme weather conditions (such as flash floods and heat waves), change in the length of seasons, and changes in crop yields.

## **IS THE HOLE IN THE OZONE LAYER RESPONSIBLE FOR CLIMATE CHANGE?**

No, it is not. Ozone is an essential gas which exists at the top of the Earth's atmosphere and absorbs harmful ultraviolet radiation from the sun. When scientists warned that man-made gases used in refrigerators and aerosols were causing a hole in the ozone layer, the international community decided to phase them out. The Montreal Protocol was developed to reduce the use of these dangerous substances called chlorofluorocarbons (CFCs).

Efforts have been successful. The ozone layer is expected to recover by the middle of the 21st century. However, CFCs – and their successor substances – have been replaced by fluorinated gases, known as F-gases. They have no effect on the ozone layer but are greenhouse gases. Once again, actions are being taken. In October 2016, the 195 countries that signed the Montreal Protocol agreed to limit the use of these harmful gases.

# 3.

## IMPACTS

The Intergovernmental Panel on Climate Change (IPCC), the international body that reviews and synthesises scientific research on climate change, points to multiple possible impacts for the rise of the greenhouse effect (e.g. IPCC, 2007a). One of the most well-known and direct effects is global warming. The last few years have successively surpassed average temperature records on Earth. 2016 was the hottest year since records began. And the trend is getting worse – 16 of the 17 hottest years have already occurred during this century.

By changing the atmosphere's composition, the climate changes, which is reflected not only in temperatures but also in precipitation patterns, droughts and floods, the intensity of tropical storms and the frequency of extreme weather events. The seasons as we know them may change. The effects of climate change therefore go far beyond global warming. Thus, the assessment of climate change impacts in each country or region should be carried out in a comprehensive manner for a range of socio-economic sectors and biophysical systems – water resources, coastal areas, agriculture, human health, energy, forests, biodiversity, and marine resources.



## Impacts on natural ecosystems and biodiversity

**Fresh water (rivers, lakes, glaciers):** Due to global warming, there will be less snowfall and more thaws, which could lead to a lack of fresh water at certain times of the year. Furthermore, in some coastal areas, rising sea levels will result in saltwater intrusion into freshwater aquifers.

**Endangered species:** Changes in temperatures force several animal and plant species to become displaced and change their behaviour. The pattern of migratory birds, for example, has been changing, with birds arriving at breeding grounds and laying their eggs earlier. However, some species are unable to adapt to the pace of change and may lose specific conditions on which they depend (food, habitat), leading to their extinction.

**Forests:** Forests have a great ecological and economic importance. They act as carbon sinks because they store carbon dioxide during photosynthesis, thus reducing the impacts of climate change. With high temperatures and extreme weather events, the trees and soil where they grow are damaged. Also, pests and new non-native and invasive species spread and forest fires increase.

**Ocean:** The oceans are more acidic. Climate change is warming the oceans, causing the marine environment to acidify, and changing precipitation patterns. This in turn produces changes in marine ecosystems, migratory routes, and imbalances in food chains, with serious consequences for many species.



## Impacts on human health and the economy

**Agriculture:** Human societies are dependent on the Earth's natural resources to grow their food. However, with unpredictable changes and patterns of rainfall, droughts, higher temperatures, increase and intensity of extreme weather conditions and outbreaks of pests and diseases, agriculture may become unviable in some areas of the planet, while in other cases substantial adaptations will be required in terms of products grown, appropriate cultivation times, techniques and food prices will rise.

**Health:** Climate change is a threat to public health. The number of risks related to high levels of air pollution, decreasing quality of drinking water and food shortages are expected to increase. Rising temperatures could cause the geographical distribution of malaria and the expansion of other tropical diseases (dengue, yellow fever, etc.). Note that the heat wave that occurred in Europe in the summer of 2003 resulted in excess mortality.

**Migrations:** Mass human migrations are predicted as living conditions deteriorate in some areas of the planet, mainly Africa and Asia, due to natural disasters, weather conditions and long-term climate variations affecting livelihoods. Typically, these migrations occur to cities, causing an increase in the urban population and causing pressure on food and housing systems.

**Tourism:** Many countries rely on tourism as a major source of income, but climate change could significantly impact geological characteristics, monuments or cultures. Certain areas can suffer huge losses, such as places where snow is crucial or destinations that may become too hot. The Chinguetti mosque is an example of a place that is at risk. Located next to the Sahara Desert in Mauritania, the mosque has a remarkable collection of Islamic manuscripts. However, the desert and seasonal flooding are constant threats.



## Disproportionate impacts worldwide

All countries contribute to climate change through greenhouse gas emissions. However, it is important to remember that climate change is not geographically uniform, meaning that some regions of the world are more affected than others.

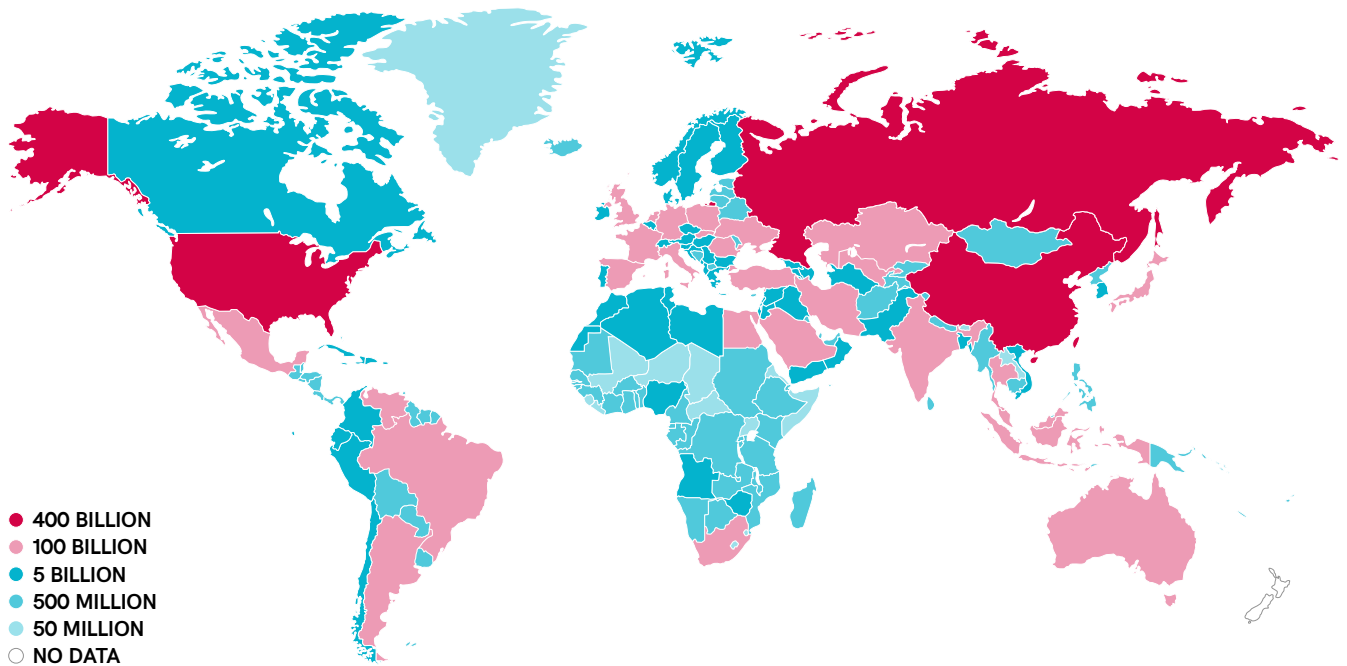
For this reason, climate change raises fundamental questions of justice and equity. Western countries are highly industrialised and have a major contribution to the problem, not only because of the current volume of emissions, but also because of their historical responsibility, as industrialisation processes have been operating for many years. Such historical record is significant due to the life cycle of greenhouse gases.

On the other hand, and despite their incomparably small contribution to the problem, countries like Tuvalu or Bangladesh are highly vulnerable, both due to their geographical characteristics, their dependence on climate and natural resources, and their economic and financial weak capacity for adaptation. Africa, the Asian Mega Deltas, and the low-lying Pacific Islands are among the regions facing the greatest threats.

They are all geographically distant from the main parties responsible for GHG emissions causing climate change. But their locations converge different vulnerability factors, such as weak urban management, environmental degradation, lack of preparedness and disaster risk prevention, poverty, and inequalities.

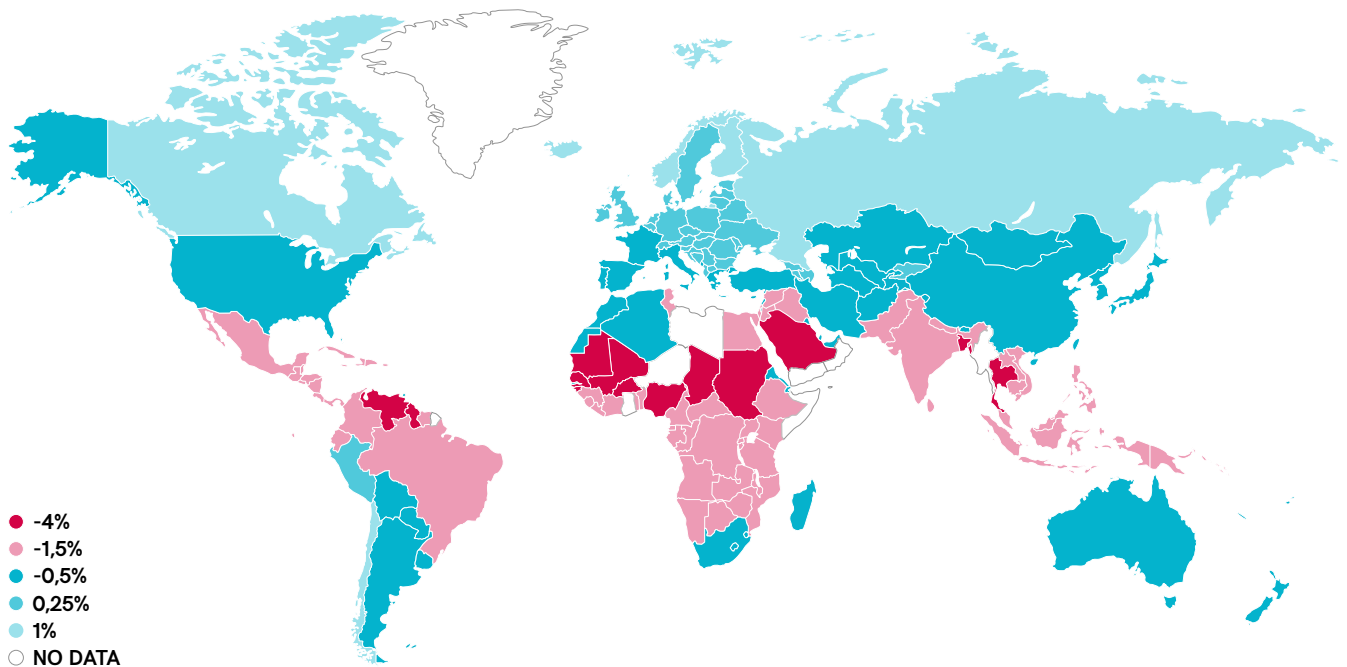
The various humanitarian crises of recent years are examples of the unequal impacts of climate change: hunger in the Horn of Africa in 2011 caused 260,000 deaths (brought about by two years of extreme drought as a result of the La Niña weather pattern); drought in the Sahel left 18 million people in a severe food crisis in 2012; Cyclone Winston in Fiji in 2016 destroyed countless neighbourhoods; more than a three-year drought in Syria has contributed to exacerbating the conflict there and worsening the humanitarian crisis that has led to thousands of displaced refugees; in 2017, the Atlantic basin saw three hurricanes simultaneously, devastating the Caribbean. In the event of natural disasters, the poorest countries have the weakest infrastructure, and their people have the least savings or insurance to deal with the destruction.

**Chart 3. Countries responsible for climate change**  
**Carbon dioxide (CO<sub>2</sub>) emissions in tonnes by 2017**



Source: Adapted from Global Carbon Project (GCP)

**Chart 4. Countries affected by climate change**  
**Projections on GDP growth per capita if temperature rises 2°C**



Source: Adapted from Pretis et al. (2018) – Uncertain impacts of 1.5° C or 2° C warming





**Women farmers in community gardens supported by the 'Kopoti pa cudji nô futuro' project (Cultivate to reap our future), implemented by VIDA and funded by the European Union and Camões, I.P. The 'capacity of horticulture as a form of poverty alleviation and as a driver of social development within and between villages' was analysed.**

**Authorship:  
Fernando Mendes**





In comparison between countries, it can therefore be seen that the populations most affected are those who contribute least to greenhouse gas emissions. This observation provides a warning about **the fact that climate change increases inequalities and often reinforces them.** There are various sources of discrimination and vulnerability that compete to prevent access to the resources and means necessary to deal with climate change. Within low-income countries, risk factors result in an even greater impact on low-income households, poorer communities, small businesses and other more vulnerable sectors of the population, wherefore focusing on disaster risk reduction is an important climate justice investment.

**Intergenerational injustices** must be pointed out since climate change will mainly affect future generations even without their contribution for the problem.

Another often neglected aspect of climate action is **gender equality.** It is known that the impact of climate change is unequal, as women tend to be more affected by natural disasters and extreme weather events, as well as by environmental degradation, affecting their livelihoods, particularly in poorer countries. Inequality is therefore compounded by the fact that they face social, economic, and political barriers that limit their ability to respond. On the other hand, women also have a fundamental role as agents of change, since they are predominantly the ones who provide health and education within the family.



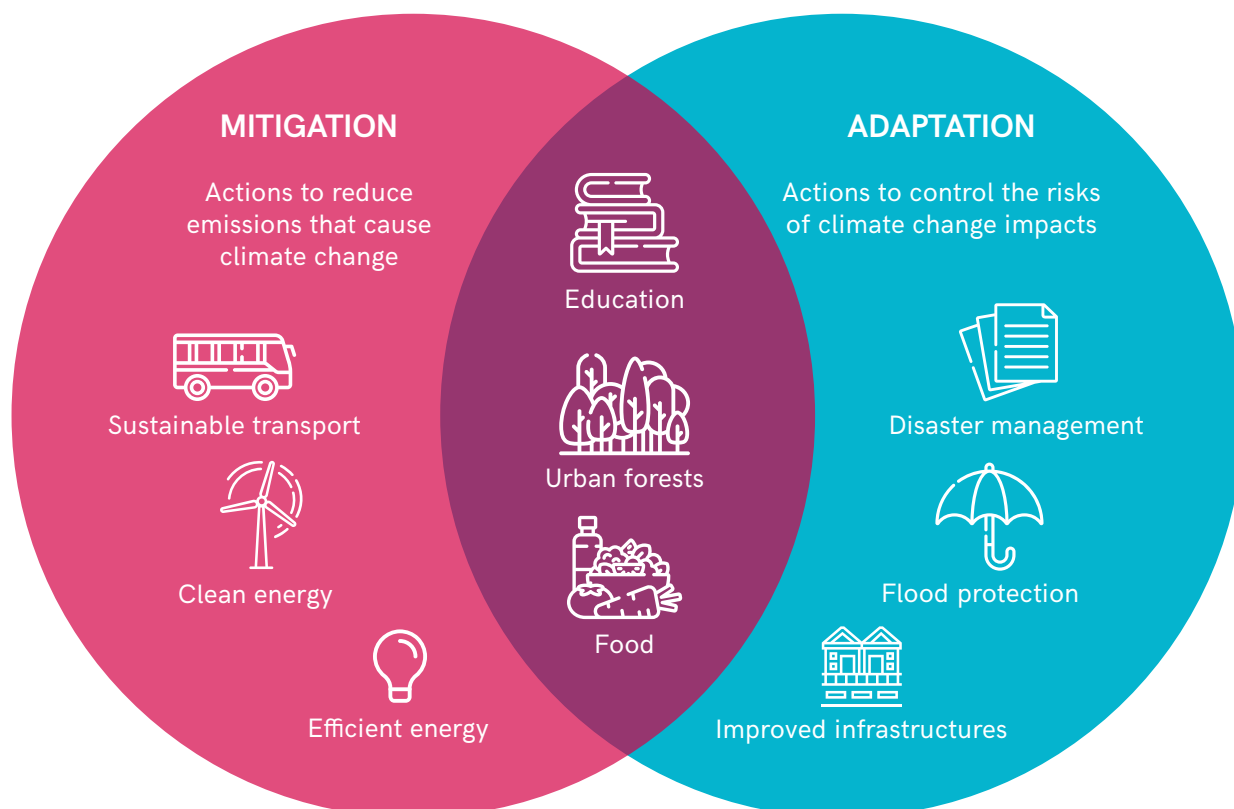
# 4.

## CLIMATE ACTION

### Mitigation and adaptation

Based on projections applying complex climate models (so-called 'general circulation models', the IPCC points to an increase of 1.1°C to 6.4°C in the global average temperature during the 21st Century (IPCC, 2007). The range of uncertainty is essentially due to the different estimates for future greenhouse gas emissions. Its unpredictability depends, among other multiple factors, on the measures adopted by the States. However, the challenge of combating climate change assumes two main strategies: **mitigation** and **adaptation**.

**Chart 5. Climate strategy**



Source: Adapted from Calgary's Climate Program. Building Climate Resilience (2017)

- Both will impact global development. Mitigation tackles the source of the problem, focusing specifically on GHG emissions, whereas adaptation creates tools and mechanisms to prepare societies to deal with the impacts of climate change. An effective combination of adaptation and mitigation measures can thus contribute to limiting climate change, its impacts in the future, and preparation and resilience to those impacts.
- Both are interlinked with a multitude of sectoral policies, from agriculture to energy, from environment to economic policy, and from science and technology to development options. Therefore, policy coherence is a crucial issue for successful mitigation and adaptation measures.
- Both responses involve high costs in the medium and long term, which are correlated. In fact, relatively rapid mitigation saves future adaptation costs, but entails large immediate investments. On the other hand, no mitigation, or slow mitigation, generates very high future adaptation costs.
- Both should be operationalized through policies and actions at various levels of governance: global, continental/regional, national, and local. As a global problem, concerted actions and effective global responses are required. Despite local impacts, it demands that communities have the capacity to deal with the problem and implement solutions as well.



## The climate agenda's origins

**1992**

Almost all countries in the world have joined the United Nations Framework Convention on Climate Change (UNFCCC), the main international treaty to combat climate change.

**2005**

EU launches the European Union Emissions Trading System.

**2009**

A United Nations Climate Conference in Copenhagen ends with no overall agreement on binding emission reductions.

**2015**

An agreement is reached on a new global climate change treaty with the Paris Agreement. 195 countries commit to reducing greenhouse gas emissions to limit global temperature increase.

**1988**

The Intergovernmental Panel on Climate Change (IPCC) is established, bringing together thousands of scientists to assess scientific evidence on climate change and its effects.

**1997**

The UNFCCC adopts the Kyoto Protocol, the world's first treaty on greenhouse gas emissions.

**2007**

The Nobel Peace Prize is awarded to both the IPCC and Al Gore for their contributions to the study and spreading of information on climate change issues.

**2014**

100 world leaders gather in New York for the United Nations climate summit. The IPCC's fifth climate change report states that the goal of keeping the temperature increase below 2°C can still be achieved.

To bridge the gap for a comprehensive and multidimensional approach, in 2015 the 2030 Agenda for Sustainable Development was adopted at the United Nations by 193 Member States. It takes as its foundation the representation of a common vision for a more just, sustainable, and inclusive world, committing all countries to implement measures and contribute to their achievement at global, regional, national, and local levels.



On the targets and indicators of the [17 Sustainable Development Goals – SDG](#), beyond the existence of a specific SDG on climate action (SDG 13), this issue can be addressed in a multidimensional way: several goals have interconnected targets featuring resilience and/or the reducing the impact of climate change. Thus, climate action is related to practically all other SDGs, and it can be said that they influence each other. We've highlighted some of these links here:

Climate action reduces the risk of natural disasters caused by weather events, thus promoting [food security and safe drinking water](#) for the poorest and most vulnerable populations. Protecting ecosystems and implementing sustainable food production systems and resilient agricultural practices adapted to climate change contribute to improving and restoring soil, while also reducing emissions, ensuring livelihoods, and contributing to attaining SDG 2.

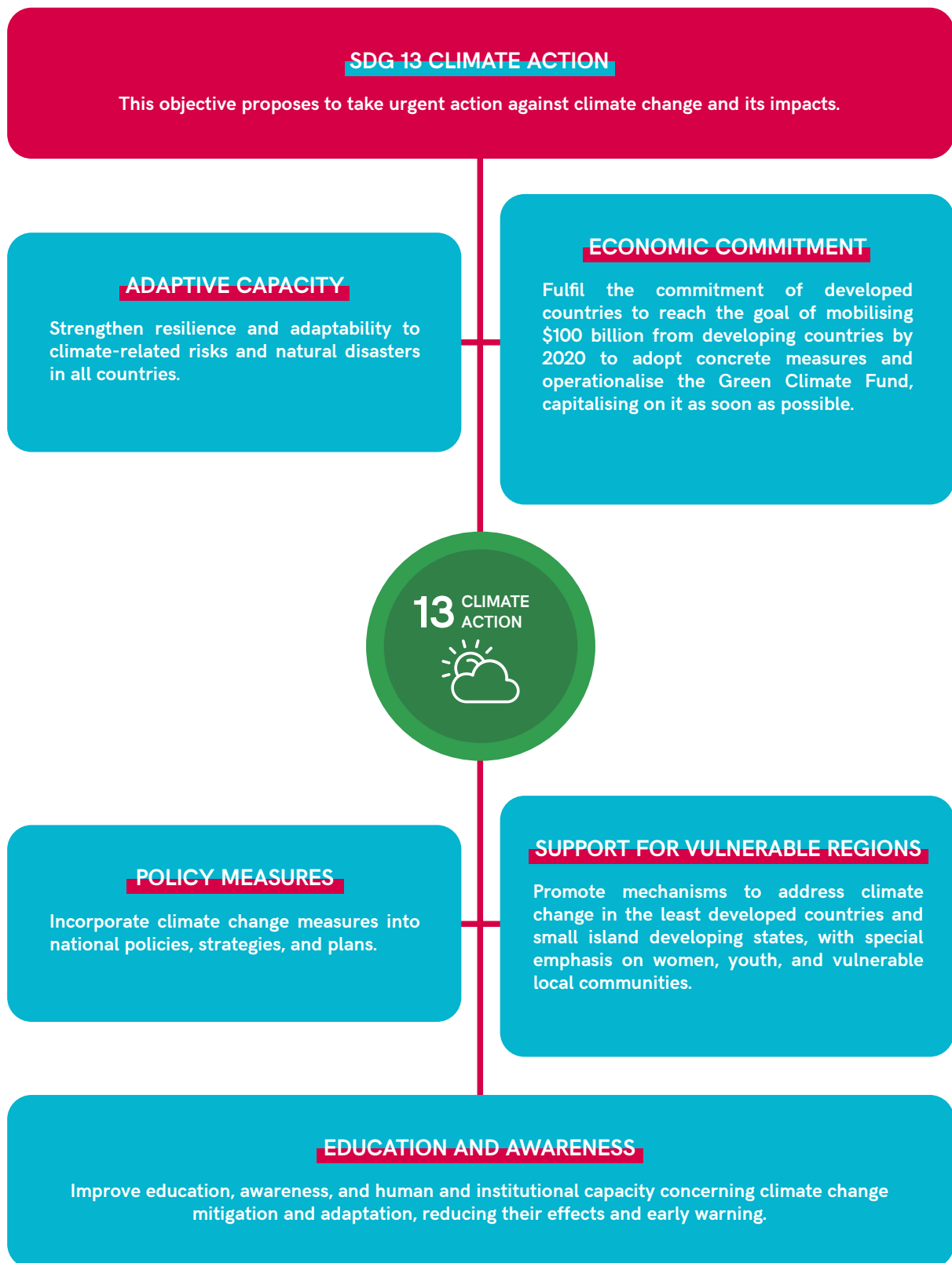
In the poorest countries, climate change may undermine the pursuit of [gender equality](#) (SDG 5), as girls and women disproportionately bear the responsibility for providing food and water to their families and communities.

The growth of [renewable energy](#) (SDG 7) helps tackle climate change but can also generate trade-offs in terms of resource claims (land and water). Also, investment in [clean energy infrastructures and technologies](#) (SDG 9) has multiple benefits, both in economic and development terms, and in the fight against climate change.

The [protection of forests and land resources](#) (SDG 15), as well as the [protection of oceans and the sustainable use of marine resources](#) (SDG 14), contribute simultaneously to preserving biodiversity, increasing resilience, and reducing climate change.

Climate change may exacerbate tensions and conflicts over scarce resources, having negative effects on fulfilling SDG 16 related to [peace and justice](#). For lasting and inclusive peace, climate risks need to be part of early warning systems and risk assessments.

**Chart 6. SDG 13 – Climate action**



Source: Adapted from Emergència Climàtica.Fets i dades

## GOOD PRACTICES...

To face the impact of climate change, some initiatives are taken with the most vulnerable populations by developing alternative solutions. One example is the Centro de Experimentação Ambiental de Djabula (Centre for Environmental Experimentation of Djabula), in the Matutuine district, implemented by the NGDO VIDA with funding from Camões, I.P., and the non-governmental development organization Fundación Ayuda en Acción, in Mozambique, which works towards the integration of **natural resources sustainable management**.

Currently, some populations are cyclically affected by extreme weather events, immediately falling into humanitarian emergencies due to the vulnerability in which they live. As a response to this context, agroecology has been explored and applied, through demonstration beds with the support of **a nursery, for the multiplication of native species adapted to the ecosystem**. The aim is to promote the **improvement and recuperation of soils, the diversification of crops** to obtain food with higher **nutritional value, the protection of plants, and reforestation (of areas already deforested to obtain charcoal, the only source considered profitable by rural families in the district)**.



Meeting at the Centre for Environmental Experimentation with community leaders and visit to the forest nursery — Project 'Our future is today: Strengthening the food and environmental resilience of vulnerable communities in the Matutuine district'. Authorship: VIDA



Planting fruit trees, according to agro ecological techniques — environmental awareness initiative in the primary school. The aim of the orchard is to ensure food security for students and the food availability to reinforce meals in schools. Authorship: VIDA



## National climate change programmes

Compared with most western countries, in Portugal environmental issues emerged socially late. The problem arose in the Portuguese public awareness from 1986 onwards through foreign policy and, essentially, with the integration into the European Union. Here's a look at the set of normative and institutional instruments regarding climate change in Portugal:

**1998**

The National Commission for Climate Change (Comissão Nacional para as Alterações Climáticas) is created by the Council of Ministers Resolution (Resolução do Conselho de Ministros), in charge of preparing the National Programme for Climate Change (Programa Nacional para as Alterações Climáticas – PNAC), which defined mitigation measures for national emissions.

**2000**

The POLIS Programme, dedicated to urban requalification and environmental enhancement of cities, is launched to combat the city's disorder, especially on the riverfronts.

**2007**

The Portuguese Environment Agency (Agência Portuguesa do Ambiente – APA) is created with the mission of proposing, developing, and monitoring the implementation of policies to combat climate change.

**1987**

The European Year of the Environment is organised and the newly created Portuguese Confederation of Environmental Defense Associations, QUERCUS and GEOTA, as well as the non-governmental environmental organization Liga para a Proteção da Natureza are called.

**1999**

The SIAM project – Climate Change in Portugal. Scenarios, Impacts, and Adaptation Measures carry out a sociological analysis of climate change in Portugal.

**2006**

The Portuguese Carbon Fund (FPC) is established to support the projects that aim to reduce greenhouse gas emissions provided in the Kyoto Protocol.

**2015**

The Strategic Framework for Climate Policy (Quadro Estratégico para a Política Climática – QEPiC), the National programme for Climate Change 2020/2030 (Programa Nacional para as Alterações Climáticas – PNAC 2020/2030), and the National Adaptation Strategy (Estratégia Nacional de Adaptação à Alterações Climáticas – ENAAC 2020) are approved.

**Portugal has a high vulnerability to climate change, essentially due to its geographical location.**

# PART II.

## COMMUNICATION ON CLIMATE CHANGE

Like other social issues, climate change (CC) is not constructed as a matter objectively but mediated by a communicational context, either through the media or through interactions with friends, family, school, church, etc. (Hulme, 2013; Carvalho, 2002).

In this regard, the physical and material existence of the phenomenon does not imply its public recognition, which depends on a construction of meaning established in a rhetorical or discursive arena and where discussion about the social, political, and ethical values surrounding the issue is promoted (Hansen, 2015; Carvalho, 2002).

Climate change issues are present in different public spheres (politics, international relations, industry, law, religion, etc.). In each of these, it evokes distinct interpretations, meanings, and ideologies in the approach to the topic, presenting the social actors (scientists, politicians, economists, etc.), who, in turn, will compete to make their position heard in a diverse scenario of interests and values and in which policies related to CC will be decided. The research aims to go beyond a science only focused on the physical aspects of CC, seeking to fill knowledge gaps about how the 'idea' of climate change is constructed and suitable, and how social values and perceptions relate to the issue. This is a phenomenon that implies an inherent communicative complexity, which makes the subject extremely difficult to understand.



In recent years, research in the field of communication has sought to advance the understanding of the aspects that hinder public assimilation of the issue, providing significant progress in knowledge about the effectiveness of different ways of addressing the subject. The communication of climate change has become an own field of studies, which, among others, investigates how its representations in the media influence the public perception of the phenomenon and the difficulties in explaining it to the audience, who tend to perceive the issue with detachment and without association to their personal experiences.

Climate change communication is the topic addressed in this chapter, which aims to initiate a reflection on the communicative challenges faced in this area and potential solutions to facilitate dialogue and public understanding of the phenomenon, its scope, and urgency.

# 1.

## RELEVANCE IN TODAY'S SOCIETY

### The emergence of the climate change communication

Although the term 'environmental communication' has only been adopted by practitioners and academics since the 1960s, communication about the environment dates to the very beginnings of human existence and man's interaction with nature (Jurin, Roush, & Danter, 2010). The late 1980s is pointed out as the defining period in the mediatisation of environmental issues, namely climate change, and therefore, to a large extent, of its existence as a 'public' issue. From 1988 onwards, there was a significant increase in the volume of media coverage, motivated by factors such as an unusually hot and dry summer in the USA. The statements made by James E. Hansen, chief scientist at NASA's Goddard Institute for Space Studies, to the US Congress on the relationship between the greenhouse effect and the temperatures recorded at the time, as well as speeches by Margaret Thatcher on climate change.

Thus, changes have been marked regarding the actors present in the media. While, initially, science and scientists were the most frequent subject and issuers in the approach to climate change, later politics became dominant (Carvalho & Burgess, 2005; Trumbo, 1996).

Although the theme is frequently portrayed, the levels of coverage revealed unsystematic fluctuations, marked by cyclical moments. Despite its continuous nature, the news values of climate change appear particularly linked to the occurrence of extreme weather events, the holding of political conferences and meetings, scientific conferences, or other events.

**The media is the main source of information on climate change. The media acts as a mediator between scientists and citizens.**

Climate change communication describes the forums in which citizens and different sectors of society act to break the climate silence, that is, the silent agreement that presupposes not talking about a topic that may seem frightening, distant, or uncomfortable. With this purpose, the aim is to raise awareness and influence behaviour and decisions that affect the planet, on the basis that understanding and action on the issue do not depend only on the scientific community, but also on the debate present in the media and other forms of interpersonal communication.

## Media literacy

Alongside the gradual immersion of the media in public and private life, closely related to technological developments, new communicative needs and demands are triggered that highlight the need to prepare citizens to know how to deal with the panoply of media, information, and content at their reach. Thus, the new networks, platforms, and digital tools, with a fundamental role nowadays, require a set of skills that allow, in addition to critically reading information, other basic needs for literacy and basic training for all citizens, to mitigate the growing risks of new forms of social exclusion.

**Media literacy** represents the ability to access, analyse, evaluate, and create media content. Faced with infinite possibilities of access to information, this is recognised as an inalienable component of citizenship, as it underlines the promotion of a critical view of the media, which enables citizens to use these media intentionally. In a society in which the individual is both consumer and potential producer of content that can be shared with many users, it is the responsibility of the literate citizen to decode the media messages. The European Union, UNESCO, and the Council of Europe have been taking consistent steps to place media literacy on the agenda of political concerns and collective awareness.

In this context, **climate science literacy** is characterised by an understanding of the impact humans have on the climate and the effect it has, in turn, on people and society (CLN, 2014). A citizen literate in climate science, faced with such an interdisciplinary subject, must be able to evaluate credible scientific information on the climate to be able to communicate and make informed and responsible decisions regarding the reduction of climate change and its impacts.



### FAKE NEWS

Fake news has become a very common term nowadays. It refers to information deliberately produced and disseminated with the intention of misleading and inducing others to believe lies or doubt truthful facts. It designates **misinformation**, presented or probably perceived as news.



### GREENWASHING

Greenwashing refers to the dissemination/promotion of supposedly positive environmental practices by entities that instead adopt practices detrimental to environmental sustainability, for the purpose of selling products and services.



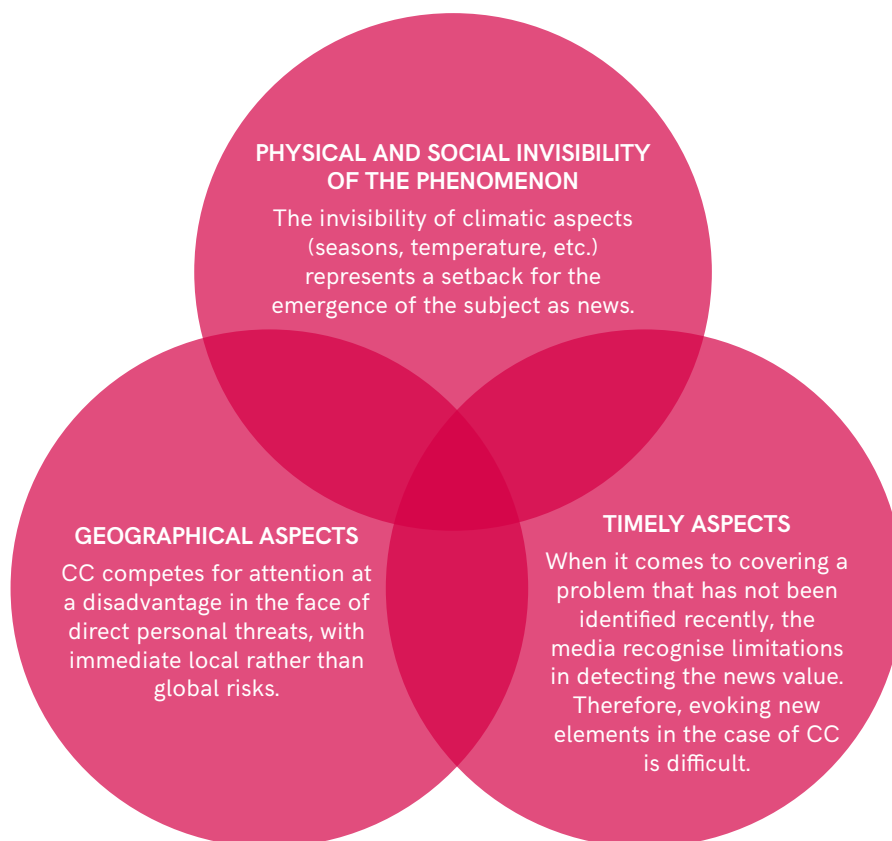
## Communication challenges

The problem of climate change has been associated with four key assumptions (Hulme, 2009):

- The time required to solve the problem is short;
- Those responsible for the problem are at the same time responsible for its solution;
- The authority needed to tackle the problem is weak or non-existent;
- Political responses are irrational when related to the scale of the problem.

These characteristics not only distance climate change from most immediate concerns of the population and their everyday life, contributing to low social engagement but also make it difficult for the media to cover climate change in-depth and systematically. Some of the aspects that make climate change communication challenging will be listed (Loose, 2017):

**Chart 7. Climate change communication challenges**



## Environmental communication in times of a pandemic

The scope and consequences of the pandemic spread of the new SARS-CoV-2 coronavirus, which causes COVID-19, allow us to establish parallels with climate issues. Both are global phenomena, find an answer in science, depend on behavioural changes, grow exponentially and non-linearly, and particularly affect the most vulnerable individuals. The following chart denotes some of the positive and negative impacts of the pandemic on climate change.

### Chart 8. Environmental impact of the pandemic



#### CARBON EMISSIONS

With the strategies of lockdown and social distancing that came during the pandemic, there was a marked decline in travel and global economic activity. These measures, associated with some trends such as the increase in teleworking, will have long-term effects in reducing carbon emissions and global warming.



#### RESIDUES

The demand for disposable medical products such as single-use gloves, surgical masks and intravenous bags has increased the pharmaceutical residues in hospitals. Also, food products with plastic packaging, perceived as a more hygienic option, were consumed more often.



#### WILDLIFE

Since the beginning of the pandemic, the idea that the planet was in the process of regeneration began to circulate on the internet, which could imply an increase in people's environmental awareness about the way they relate to other living beings. Wild animals were filmed walking freely through urban areas. Possibly the most famous publication emerged from Italy and showed dolphins and swans in the Venice canals. Fake news, according to National Geographic. Dolphins were not filmed in Venice and swans are regular visitors to the canals.



#### ENERGY

The demand for broadband has increased due to online conferences and studies as well as streaming videos and the use of cloud services. However, not all experts agree that this consumes a lot of power. Some experts say that 'big data' and algorithms, such as those used to display different products to online shoppers, consume much more computing power through 'data centers'.

Despite their similarities, COVID-19 and climate change assume distinct places in media agendas and public interest. Since the emergence of the health crisis, the communication has focused on the impacts and fight against the propagation of the new coronavirus, neglecting other emergencies, equally urgent and a priority, such as climate change, which have not dissipated – they have only lost the focus of the media and public agendas in the face of more tangible risks now, such as the loss of lives and the paralysis and/or decline of economic activities. Thus, the following question arises: how can we contribute to the correct dissemination of climate change risks in a period of overlapping crises?

The first point to emphasise concerns the different stages of scientific knowledge that underpin COVID-19 and climate change. Scientists know the human causes of climate change, the likely temperature projections and impacts, and the societal changes needed to reduce emissions. On the other hand, there are many uncertainties about the exact origins of COVID-19, the actual rates of infection and mortality, the likely individual and social responses to the information, etc. Therefore, any comparisons between the media's treatment of scientific information should be very cautious.



On the other hand, it should be noted that environmental issues must be understood in an interrelated way with other important issues for the world, namely the economy, politics, culture, and especially health. The climate change has a double impact when it comes to health since, in addition to its direct impact, such as deaths associated with heat waves, for example, it increases the threats that affect biodiversity, making other diseases possible. Moreover, the risk of a pandemic arising from the consequences of climate change was already predicted by scientists, who explained that the loss of biodiversity acts as a catalyst for the spread of the virus and infectious diseases in general. As such, broadening the population's awareness of the climate emergency also means informing about disease transmission.

On the other hand, evidence suggests that awareness of the risk of extreme weather events increases soon after a flood, for instance, which allows us to assume that changes in attitude or behaviour are more easily provoked by significant or perceived events. If people are facing a crisis (Covid-19), they may not have the capacity to reflect on another one, so sharing messages about climate change may demonstrate insensitivity to other adversities. The role of communicators is, therefore, to adapt their public discourse and strategies to the audience. Responses will not be the same for different social groups and political perspectives.

# 2.

## PUBLIC PERCEPTIONS AND ENGAGEMENT WITH CLIMATE CHANGE

In the scientific community, it is now consensual that climate change poses a major risk to human societies in the coming decades and centuries and that, to prevent further damage, greenhouse gas emissions resulting from human activities must be significantly reduced (IPCC, 2007). However, and despite the **scientific consensus**, research shows that this perception is not shared by the majority of citizens who either deny the occurrence of climate change or its anthropogenic nature, or demonstrate awareness of the problem, but a low level of environmental culture and a great dependence on the media as an information source. To understand these ambivalences, it is important to know the cognitive, affective, and ideological aspects of the recipient of the message that may affect the communication of climate change.

**Chart 9. Factors affecting audience understanding**

### AGE GROUP

Younger age groups are more likely to believe the scientific consensus and more optimistic about the capacity of mitigation actions.

### ACADEMIC QUALIFICATIONS

Education plays an important role in public understanding.

### POLITICAL IDEOLOGIES

A more progressive ideology is usually associated with greater concern for CC, while a more conservative ideology is associated with less concern, hence a preference for inaction.

### VALUES

More egalitarian and community values are associated with greater concern about risks and impacts and a more urgent need for action.

### PERSONAL EXPERIENCE

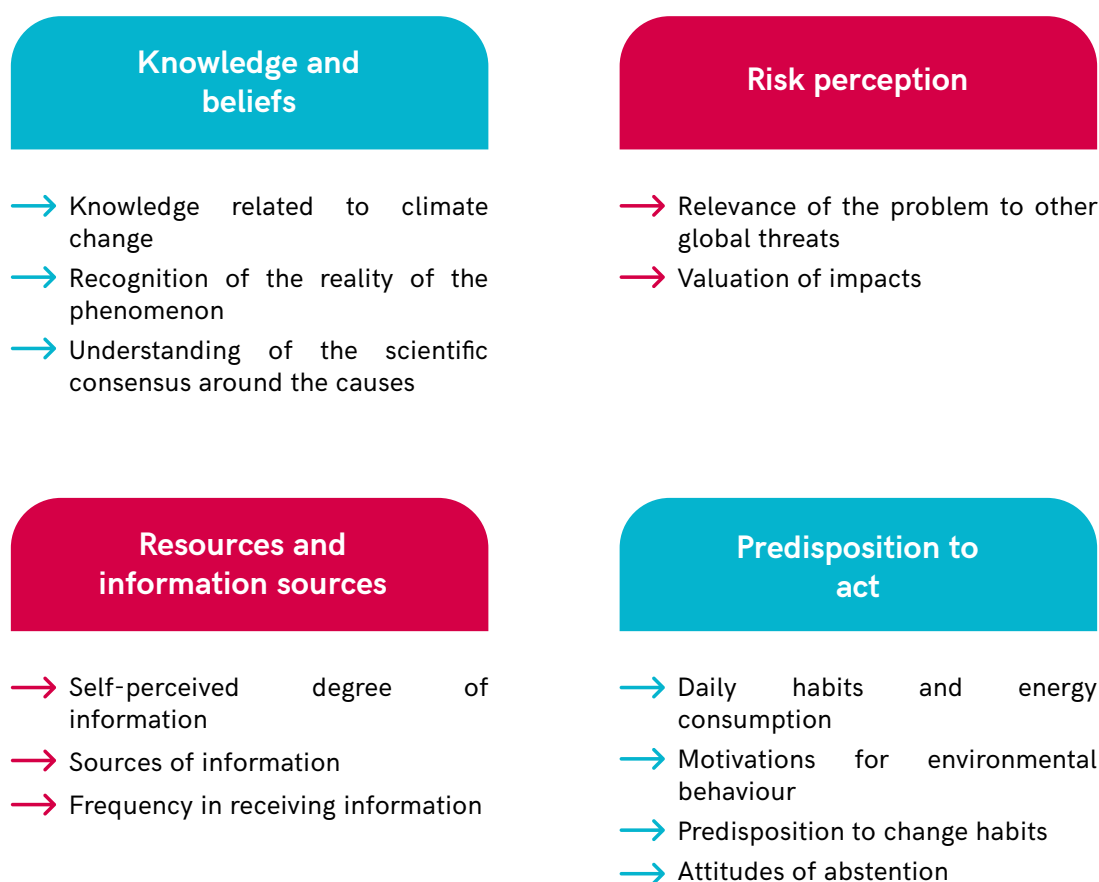
Direct experience of an extreme weather event can increase risk perception, perceived vulnerability, behavioural intentions, and support for mitigation policies.

### MEDIA COVERAGE

The public is generally unaware of climate-related issues that are not covered in the media.

Building prior knowledge of the particularities and information needs of each specific audience is a key step in developing effective communication on climate change. A similar message may be received in different ways causing different impacts. It is in this context that studies have emerged with the purpose of exploring the knowledge, beliefs, and attitudes of the population, both in the personal and collective sphere, as well as the predisposition to adopt more sustainable lifestyles.

**Chart 10. Factors in the public's relationship with climate change**



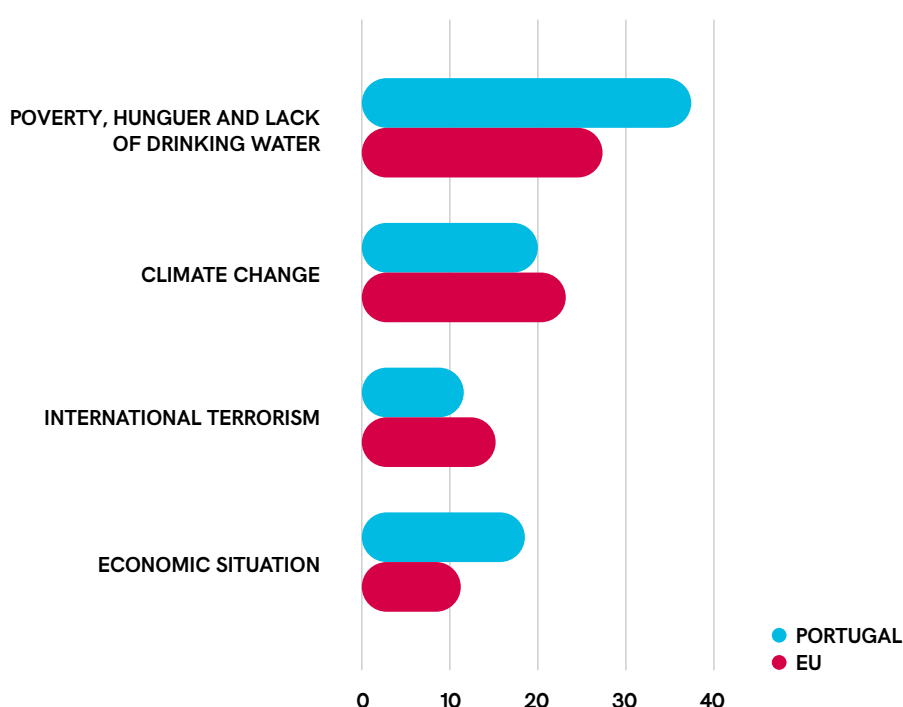
Recognising the factors that intervene in the way individuals interpret climate change and act upon it is decisive. Not all social groups have the same capacity for decision and action, nor do their habits have the same impact. For example, informing an individual on how to carry out actions would have no impact if they were not yet aware of the issue, and vice versa, too much information would not benefit efforts to motivate individuals who are already well informed. It is therefore necessary to define the target group for which the strategy, action or communication resource is designed.



Based on these parameters, Eurobarometer builds specific surveys focusing on the perceptions and expectations of EU citizens regarding climate change. The analysis of the most recent data shows that European citizens are very aware of the importance of climate change.

In the specific case of Portugal, almost nine out of ten respondents consider climate change a 'very serious' problem (87%), an increase of four percentage points (pp) since 2017 and significantly higher than the EU average of 79%.

**Chart 11. Most serious problem facing the world**

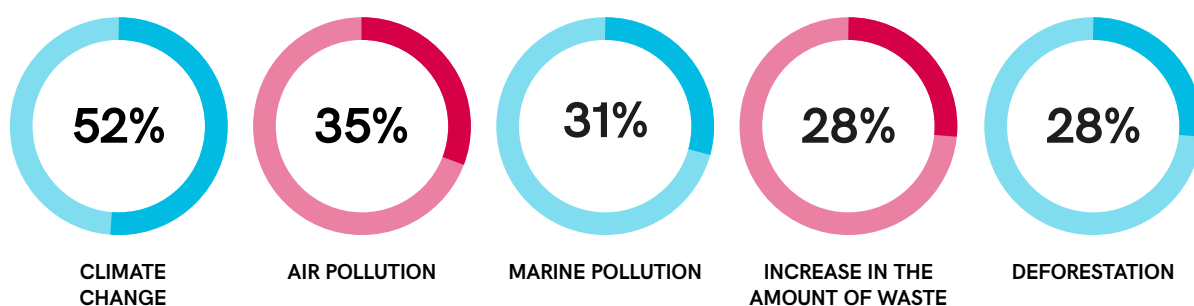
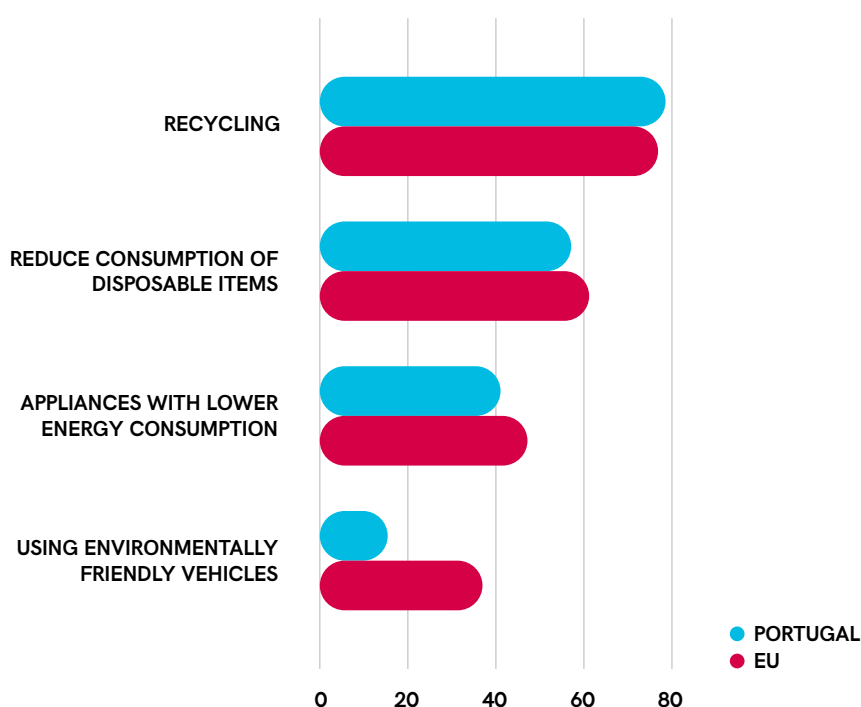


Almost one in five Portuguese (19%) considers this to be the most serious problem the world is facing right now – an increase of 15 pp since 2017, although below the EU average of 23%. In Sweden and Denmark, climate change is considered the world's most serious problem.

Respondents in Portugal are more likely than the EU average to say they have personally taken action to combat climate change in the past six months (74%, well above the EU average of 60%), an increase of 14 pp since 2017.

Europeans rank climate change as the most important environmental issue.

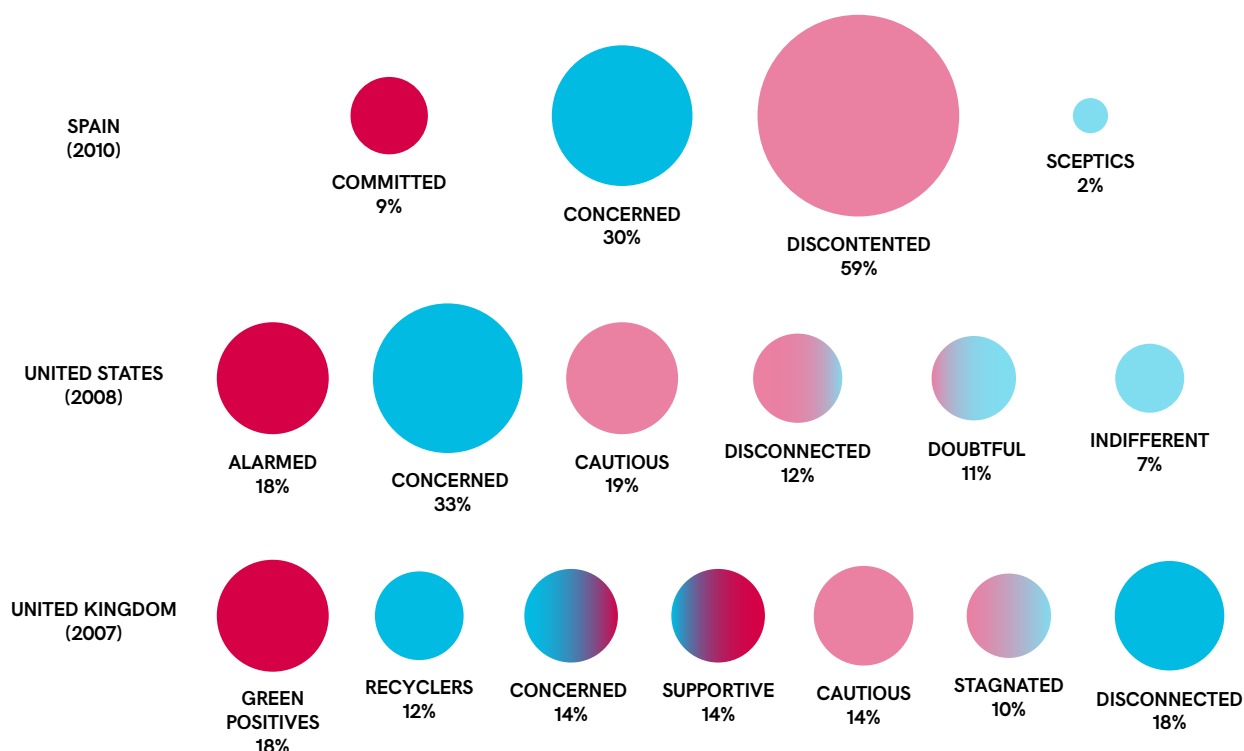
**Chart 12. Measures to combat climate change**



Considering that a diversified public should not be approached as a homogeneous mass (Roser-Renouf et al.), international research is dedicated to build profiles based on the population's levels of certainty, predispositions to accept or reject climate science, cultural values, media use, attention paid to information, among others. The differences detected will act as indicators of the type of information messages that each group seeks and is more receptive to, communication channels and thus develop more effective communication strategies.

The case of the North Americans, for example, visible in chart 13, shows a population group designated as 'alarmed', already convinced of the reality and danger of climate change, strongly motivated to learn about solutions, and therefore with the potential to act as opinion leaders. On the other hand, at the other extreme, a group is identified that, although critically examining the messages about climate change, defends a diametrically opposed position. It rejects scientific consensus while uncritically accepting information that questions climate change. An approach aimed at this segment of the population should consider not aim to provoke counter-arguments, but rather to engage in persuasion. These and other profiles highlight the heterogeneous segmentation not only of the North American public, but of the rest as well.

**Chart 13. Comparison between Spanish, North American and British societies in the face of climate change**



**Source:** La sociedad ante el cambio climático: conocimientos, valoraciones y comportamientos en la población española (2011)

# 3.

## COMMUNICATION STRATEGIES

In the early days of modern science, the scientific community and policymakers subscribed to a view in which the public was perceived as lacking in information and education. As such, strategies to engage the population with the issue of climate change began by addressing mainly the information deficit and the dissemination of knowledge, with the aim of bringing the attitudes of the general public in line with the precepts indicated by experts and substantiated by scientific data.

Even though the level of awareness and greater understanding of science has seen a positive evolution, it has not translated into meaningful actions, behavioural changes, and involvement. For example, an individual may perceive the urgency of acting on the environmental problem, have positive attitudes regarding the adoption of actions that contribute to reducing the problem, and even be subject to social pressure from friends and family who also perceive this relevance. However, despite meeting all the conditions presented for a high level of motivation, it may not implement them. Thus, there is a gap between the actions suggested by the scientific community and the behaviours adopted with the potential to reduce the negative effects of the phenomenon.

Given the evidence, it is important to reflect on the effectiveness of climate change communication and its weaknesses to offer alternatives that adjust pro-environmental beliefs and practices.



## Communicating scientific and climate uncertainties

Uncertainty is inherent to the scientific procedure. In the field of climate change, representations of uncertainty are particularly important, given their scientific complexity. Despite the remarkable advances in science, there are still discrepancies between scientists about the existing knowledge, especially regarding the intensity and the fast-spreading of the effects, as well as the ways in which they will extend throughout the world.

However, presenting uncertainty to the population can lead to insecurity and weaken the will for change, especially if the demands and efforts for change are significant. Due to the human need for predictability, uncertainty is uncomfortable. Predictability allows protection, while uncertainty breeds anxiety. Predictions provide control, help prevent threats to people's physical and material well-being, and liberate them from fear. The presence of uncertainty hinders the human ability to predict the future. Consequently, it is crucial to obtain effective ways of communicating essentially uncertain information, starting by contextualising facts on which there is a broad scientific consensus.

**97% of climate scientists confirm that climate change exists and is caused by humans.**

Uncertainty can be used as a resource for communication by emphasising the tools employed by climate sciences: scenario building, use of models and simulations, consensus-building processes on controversial topics, etc. To solve the problem, IPCC scientists developed a 'trust terminology' to reveal estimates of uncertainties in forecasts and everyday language. For example, 'very high confidence' was a term used to refer to a prediction that had at least nine chances out of ten of being correct. Other order terms are 'high', 'medium', 'low' and 'very low' confidence.

Another aspect concerns the naming of the problem and the choice of certain expressions over others. If for many audiences – such as politicians, business leaders, or the military – talking about the risks of climate change is probably more effective than talking about uncertainty, then one of the strategies is to use a framework of 'risk' rather than a framework of 'uncertainty'. The idea of risk is closer to people due to the area of insurance, health, and public safety.

In any case, it is important to recognise and emphasise that scientific uncertainty by itself is not a justification for not acting or for adopting policies and behaviours that address the issue in a casual way. Rather, it highlights how prudent it would be to develop contingency plans and adopt adaptive management strategies.



The following table lists words commonly used to describe climate change that have different meanings to scientists and to the general public.

SCIENTIFIC WORDS	NON-SCIENTIFIC MEANING	APPROPRIATE WORDS
Increment	Improve	Intensify, raise
Uncertainty	Without knowledge	Gap
Risk	Unlikely event	Probability
Error/mistake	Wrong, incorrect	Uncertainty related to a measuring device or model
Bias	Deliberate and unfair distortion	(Unintentional) distortion in the interpretation of the observed value
Positive trend	A good trend	Upward trend
Positive feedback	Constructive criticism	Reinforcement cycle, vicious circle
Theory	A hunch, opinion, conjecture	Physical understanding of operation
Hypothesis	Assumption	Set of ideas used in the understanding of the phenomenon in question
Signal	Indication	Positive/negative value, plus/minus sign
Values	Ethics, money	Numbers, quantity
Manipulation	Exploration	Changes in experimental or model conditions to study the impact of that condition
Scheme	Conspiracy	Diagram
Productivity	Hard work	Photosynthesis
Anomaly	Abnormal occurrence	Deviation from a long-term pattern

**Source:** Adapted from A comunicação das mudanças climáticas. Um guia para cientistas, jornalistas, educadores, políticos e demais interessados (2018)

## Climate denial

Humans are able to reject uncomfortable or threatening information. In fact, denial can be considered a common way of dealing with problems or conflicts, a defense mechanism. Climate change denial is expressed in different ways: from **denial of the phenomenon itself** ('it is not happening'), **denial of human responsibility** ('it is a natural phenomenon'), **denial of the risks involved** ('it is not dangerous') or **denial of the need to act against climate change** ('we must deal with more urgent or important problems'). These responses can work in a logic of **organised denialism**. The latter acts in a planned way to encourage negative reactions as a strategy to defend economic or corporate interests. From the argumentation, made from denial, the following features stand out:

**The use of fake experts as a resource often complemented by the defamation of more recognised experts and researchers.**

**Selectivity in the use of scientific sources that leads to building arguments based on a small number of papers that are not representative of the whole.**

**The creation of expectations impossible to satisfy through the contributions of science (for example, denouncing the absence of precise temperature measurements before the invention of the thermometer).**

**The use of logical fallacies, such as distorting the opposing argument to make it more easily refutable or using false analogies.**

One of the most striking aspects of the media representation of climate change has been the visibility given to climate deniers, despite their lack of scientific credibility. Paradoxically, growing citizen awareness of climate change is fueling a larger audience's search for simple speeches that convey certainty and inhibit change, often at odds with the IPCC's positions.

While it is recommended not to pay too much attention to climate change deniers, it is important to remain vigilant to how denial may be infiltrating society and the communication strategies used, as they tend to target very specific audiences for their direct interest and prominence in climate policies, (for example: the coal miners' unions, executives of automobile industry, etc.). Thus, we will be able to move to another level of discussion, oriented not towards consensus on the existence of climate change, but towards proactive responses.



## Managing emotional aspects

Communication on climate change has emotional components that should not be disregarded, as they weigh significantly on the way society represents the problem and on personal and collective reactions. The emotional connection to the problem, however, if it comes from an excessive exposure to the sense of threat and vulnerability, can prove to be counterproductive and induce feelings of apathy or helplessness. Nowadays, essentially because of the media, people are confronted with a bewildering number of different emotional experiences. So, it is important to consider the recipients of the communication.

Some factors are listed regarding the stance of climate change communicators that may prevent the audience from emotionally debilitating:

Decide on which risks to communicate to the public and elaborate connections between the risks, such as the link between climate change and disease, for example.

Compensate information that provokes an emotional response with analytical information.

Recognise that the public has other urgent problems. Create a balance between pre-existing concerns and climate change.

Trigger the public reflection about their level of concern and the potential disconnection caused by exposure to excessive emotional appeals.

While it is important not to minimise or tone down the seriousness of the situation and the inherent risks, messages that appeal to fear and emphasise the threat can have negative consequences. Climate change becomes a distressing topic, a permanent source of pessimistic news. It is, therefore, defended the importance of creating 'positive resonances' that provide motivation and power to act and that broaden the spectrum of topics related to climate change to health issues, quality of life, human relations, among others.

## **Emphasize scientific rigor**

Confronted with such a complex phenomenon, it is important to deconstruct misconceptions and social representations about climate change. The communication contents should remain coherent, also to prevent them from being adopted as a common strategy by climate deniers.

As examples allied to common sense, we highlight the widespread confusion between the stratospheric ozone layer degradation and climate change, commonly perceived as linked problems and mentioned together. Another reference concerns the imprecision of certain terminology that, because of being misinterpreted are misused, as is the case with climate and weather. Thus, the real risks posed by climate change to human health should also be disclosed and identified more clearly, bearing in mind that a significant proportion of the population does not know what they are or mistakenly thinks that 'skin cancer' is the only disease that can derive from exposure. Therefore, there are several controversies that need to be clarified.

To ensure credibility, the research focuses on three main fields – causes, consequences, and solutions – and is grounded on the following arguments:

**It is necessary to know the causes to recognise the roots of the problem.**

**It is necessary to know the consequences in order to build a more realistic perception of risk and understand vulnerabilities.**

**It is necessary to know the solutions, to counteract the depressing vision associated with climate change and conceive it as a social challenge to intervene.**

## **Communicate in a humanized way**

Graphs and tables that are widely used to show the problem of climate change have implications for the scientific community but fail to create a sense of urgency among the general public. The transmitted data, even if understood, hardly leads to any action. The IPCC reports highlight effects of climate change that can already be observed in the earth system and are likely to evolve in the coming years. However, the risks that are perceived as distant and long-term do not generate the same alarmism as other imminent social and personal threats.

That said, it is pertinent to transfer climate change to a 'local' and 'everyday' dimension and to overcome the current social perception that conceives it as a distant and abstract issue. Climate change is a global threat, but its impact needs to be felt through practical examples that are familiar to audiences, such as flooding of cities, loss of agricultural crops, or the sliding of coastal structures into the ocean. It is also necessary to communicate how to act in domestic scenarios. Lifestyle routines are not irrelevant to climate change. However, it is not simple to identify and visualise the connections in order to find concrete and viable alternatives for change.

Therefore, analytical tools of a scientific-technological nature must be articulated with the emotional appeal that confirms the 'human point of view':

**Vivid images, in the form of footage, metaphors, personal testimonies, analogies with real life and concrete comparisons.**

**Messages designed to create, remember and highlight relevant personal experiences and to get an emotional response.**



## Conveying motivational messages

Discussing a risk or uncertainty does not have to represent a communication barrier when used as a **positive framework**. Linking climate change mitigation to optimistic desires and aspirations, such as enjoying clean air, protecting health, inheriting a better future for future generations or solidarity with the disadvantaged develops feelings of hope. The same assumption is reproduced when the statements are closely related to the responses needed to other environmental or social problems, such as the conservation and distribution of drinking water reserves, the preservation of biodiversity, tackling imbalances in development and social and economic inequality. When the perception is developed that deprivation and harm may not occur if preventive action is taken, the public is more likely to act in a pro-environmental manner. Hence, despite the different levels of responsibility against climate change, the importance of individual action needs to be reassessed.

Here are two examples of discourse constructions on climate change (Corner, Adam et al.):

**'If we take action,  
the probability of flooding  
occurring in winter will be 20%'.  
POSITIVE FRAMEWORK**

**'If we don't act,  
the probability of  
flooding will be 80%'.  
NEGATIVE FRAMEWORK**

# Bibliography

- ABBASI, Daniel R. (2006). *Americans and Climate Change: Closing the Gap between Science and Action*. USA: Yale School of Forestry & Environmental Studies. ISBN: 0-9707882-4-X.
- AMARAL, M. F., LOOSE, E. B., GIRARDI, I. M. T. (2020). *Minimanual para a Cobertura Jornalística das Mudanças Climáticas*. Brazil: FACOS-USFM.
- ANABLE, J., LANE, B., KELAY, T. (2006). *An evidence base review of public attitudes to climate change and transport behaviour*.
- AZEVEDO, A., GUERNER, A. (coord.) (2018). *Inovação no Ensino das Alterações Climáticas: o Papel dos Média*. Santa Maria da Feira: Rainho & Neves, Lda. ISBN: 978-989-20-8848-8.
- CAMARGO, João (2018). *Manual de Combate às Alterações Climáticas*. Lisboa: Edições Parsifal. ISBN: 978-989-8760-49-4.
- CARTEA, P., BLANCO, M., HERNÁNDEZ, F., SOUTO, P. (2011). *La sociedad ante el cambio climático. Conocimientos, valoraciones y comportamientos en la población española*. Spain: Fundación Mapfre. ISBN: 978- 84-9844-303-5.
- CARVALHO, A. (2011). *As Alterações Climáticas, os Media e os Cidadãos*. Coimbra: Grácio Editor. ISBN: 978-989-8377-17-3.
- CE – Comunidade Europeia (2018). *O nosso planeta, o nosso futuro. Juntos na luta contra as alterações climáticas*. ISBN: 978-92-79-73326-0.
- CEACV – Centre D’Educació Ambiental (2016). *Manual de Emergencia Climática. Hechos y datos*.
- CORNER, A., LEWANDOSKY, S., PHILLIPS, M., ROBERTS, O. (2015). *The Uncertainty Handbook*. Bristol: University of Bristol.
- CHADWICK, A. (2017). *Climate Change Communication*. DOI: 10.1093/acrefore/9780190228613.013.22.
- DAMICO, J., BAILDON, M., PANOS, A. (2018). *Media Literacy and Climate Change in a Post-Truth Society*. *Journal of Media Literacy Education*. v. 10, n.º 2, p. 11 – 32.
- DEEB, A., FRENCH, A., HEISS, J., JABBOUR, J., LAROCHELLE, D., LEVINTANUS, A., KONTOROV, A. (2011). *Climate change. Starter’s Book*. França: United Nations Educational, Scientific and Cultural Organization. ISBN 978-92-3-101001-9.
- DGS – Direção-Geral da Saúde (2011). *Alterações climáticas - que desafios para a saúde?. Estratégia Nacional de Adaptação às Alterações Climáticas – Grupo de Trabalho sectorial saúde humana*.
- ERSTAD, O. (2015). *Educating the Digital Generation Exploring Media Literacy for the 21st Century*. *Nordic Journal of Digital Literacy*. ISSN: 1891-943X.
- FERREIRA, Patrícia Magalhães (2017). *Alterações Climáticas e Desenvolvimento*. Lisboa: FEC | Fundação Fé e Cooperação.

- GUTTLER, J. (2018). A Comunicação das Alterações Climáticas. Um estudo sobre os efeitos do framing da saúde. Dissertação de Mestrado em Ciências da Comunicação Cultura, Património e Ciência.
- KIRSCHNER, P., BRUYCKERE, P. (2017). The myths of the digital native and the multitasker. *Teaching and Teacher Education*. v. 67, p. 135-142.
- IPCC - Intergovernmental Panel on Climate Change (2014). *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Suíça: IPCC.
- (2007). *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Accessed from: <https://www.ipcc.ch/report/ar4/wg1/>.
- MCGONAGLE, Tarlach (2017). "Fake news": False fears or real concerns? *Netherlands Quarterly of Human Rights (NQHR)*. Vol. 35(4) 203-209. DOI: 10.1177/0924051917738685.
- MONTEIRO, A., MADUREIRA, H. (2018). Uma visão partilhada dos riscos climáticos na área metropolitana do porto (Portugal). *A Climatologia Geográfica Brasileira: o ensino, os métodos, as técnicas e os desafios para o século XXI*.
- PEREIRA, S., PINTO, M., MADUREIRA, E., POMBO, T., GUEDES, M. (2014). *Referencial de Educação para os Media para a Educação Pré-escolar, o Ensino Básico e o Ensino Secundário*. ISBN: 978-972-742-373-6.
- POSETTI, J., IRETON, C., WARDLE, C., DERA KHSHAN, H., MATTHEWS, A., ABU-FADIL, M., TREWINNARD, T., BELL, F., MANTZARLIS, A. (2018). *Journalism, 'Fake News' & Disinformation. Handbook for Journalism Education and Training*. France: United Nations Educational, Scientific and Cultural Organization. ISBN: 978-92-3-100281-6.
- SANTOS, Filipe Duarte (2018). *Alterações climáticas: situação atual e cenários futuros*. Fronteiras XXI.
- SILVA, Andreia Fernandes (2019). *O papel da literacia mediática na promoção da competência crítica*. Instituto de Sociologia na Universidade do Porto.
- SHOME, D., MARX, S. (2016). *A Comunicação das Mudanças Climáticas: Um guia para cientistas, jornalistas, educadores, políticos e demais interessados*. es: Centro de Pesquisas sobre Decisões Ambientais. ISBN: 978-85-462-0343-7.
- TAVARES, Bruno Ribeiro (2013). *O ambiente e as políticas ambientais em Portugal: Contributos para uma abordagem histórica*. Dissertação de Mestrado em Cidadania Ambiental e Participação.
- TOMÉ, J., ACEÑA, P., CAMPO, T., PEREJÓN, A., LEIRA, G., SOLÍS, J., CABEZA, A., RAMIREZ, E., OCAÑA, V. (2011). *Educación Ambiental y Cambio Climático*. Spain: Gandulfo impresores S.L. ISBN: 978-84-92807-68-0.
- WEBSTER, R. MARSHALL, G. (2019). *The #TalkingClimate Handbook. How to have conversations about. Climate change in your daily life*.

# Charts Index

Chart 1. Greenhouse effect	14	
Chart 2. Greenhouse gas emissions by economic sectors	17	
Chart 3. Countries responsible for climate change	24	
Chart 4. Countries affected by climate change	24	
		Chart 5. Climate strategy 27
		Chart 6. SDG 13 – Climate action 32
		Chart 7. Climate change communication challenges 39
		Chart 8. Environmental impact of the pandemic 40
Chart 9. Factors affecting audience understanding	42	
Chart 10. Factors in the public's relationship with climate change	43	
Chart 11. Most serious problem facing the world	44	
Chart 12. Measures to combat climate change	45	
Chart 13. Comparison between Spanish, North American and British societies in the face of climate change	46	

