SUSTRAINY
Sustainable action Training for Youth

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SUSTRAINY PROJECT

ENVIRONMENTAL

TOPIC N°1 CLIMAT CHANGE

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SUSTRAINY – Sustainable action Training for Youth. Project number:2019-3-FR02-KA205-016556

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Introduction to the topic

According to the definition, climate change "refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer."[1]

Along with rising global temperatures, the weather and climate are changing. In many places in the world we can observe floods, intense rain, droughts or even severe heat waves because of the changes in rainfall. All of these changes will be more visible in the coming decades and will be a big challenge for our society and environment.

EU is contending with the climate change, providing ambitious policies. EU cooperates with international partners. The main aim is to reduce the greenhouse gas emissions by 2050.

EU legislation and policies:

o EU Emissions Trading System (EU ETS) – The main aim is to reduce greenhouse gas emissions from industry, flights and power sector in EU.

o Sectors, not belonging to emissions trading, such as transport, buildings and agriculture, have their own national targets.

o Ensuring, that our lands and forests will help us with the climate change problem.

o Providing CO2 emission standards for vehicles will help in reducing greenhouse gas emissions due to transportation.

o Developing energy efficiency and using renewable energy.

o Managing climate policies and governance of EU energy.

o Implementing innovative low-carbon technologies, which will help us reduce the greenhouse gas emissions.

o Phasing out the fluorinated greenhouse gases, which are contributing to climate warming.

1 https://19january2017snapshot.epa.gov/climatechange/climate-change-basic-information_.html

o Conservation of the ozone layer

o Financial help to climate actions.[1]

The main key energy and climate targets:

- 2020 climate and energy package
- 2030 climate and energy framework
- 2050 long-term strategy

EU constantly tracks the progress on cutting emissions by checking, monitoring and reporting. All of the actions related to fighting with climate change will need investments, innovation and research.

1 https://ec.europa.eu/clima/policies/eu-climate-action_en

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Chapter 1 – Greenhouse gases

1.1 What are greenhouse gases?

Greenhouse gases are components of the Earth's atmosphere which, due to their physico-chemical properties, are able to retain solar energy within the Earth's atmosphere. These gases have a direct impact on the greenhouse effect because they absorb infrared radiation from our planet.

Greenhouse gases occur in the atmosphere both as a result of natural processes and in connection with human activity. The impact of individual gases on the greenhouse effect varies and depends on:

- Absorption rate, i.e. the ability of a substance to absorb infrared radiation
- The life span of this substance in the atmosphere.

These two factors also determine the global warming potential (GWP), i.e. the potential to create the greenhouse effect. In determining this indicator, the amount of heat absorbed by a given gas of a certain mass is compared to the amount of heat absorbed by the same mass of carbon dioxide. The GWP for carbon dioxide is 1 and from it the GWP for other substances is calculated.

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1.2 Types of greenhouse gases

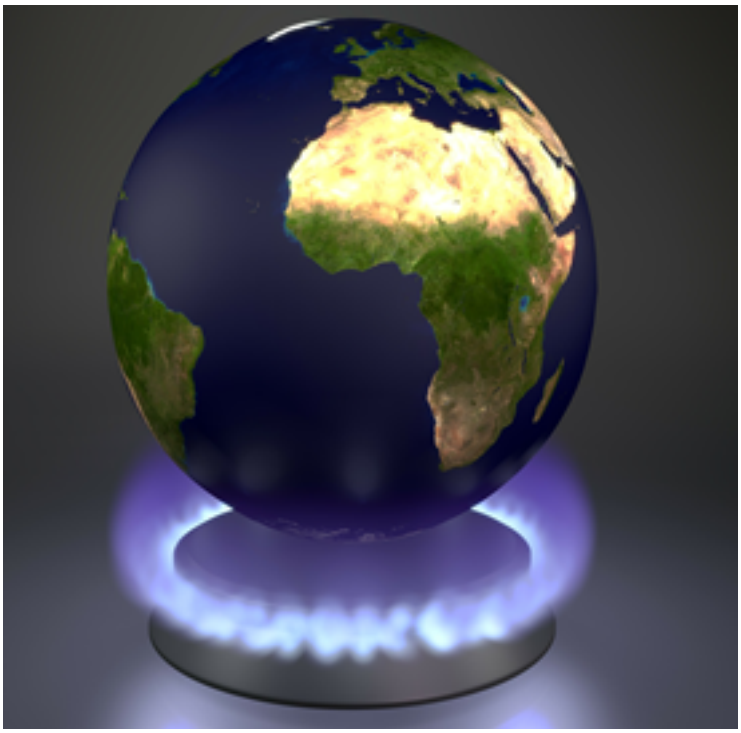
Gases impacting on the greenhouse effect[1]:

• Steam - has the greatest impact on the greenhouse effect. Its content in the earth's atmosphere is very diverse and ranges from 40 to 95%. It depends on the cycle of water circulation in the environment, i.e. the processes of evaporation, condensation, sublimation and resubmission. Steam is 95% responsible for the greenhouse effect, and its presence in the atmosphere is almost completely independent of human activity.

• Carbon dioxide - The presence of carbon dioxide in the air is a natural phenomenon because, among other things, it is released when breathing and taken during photosynthesis. Unfortunately, since the industrial revolution, the concentration of this gas in the atmosphere has increased from less than 10% to about 30%. The problem concerns mainly developed countries, as it is mainly the result of burning large amounts of fossil fuels.

• Methane - is another greenhouse gas, which is produced both by natural processes and by human activity. Naturally, it is produced mainly by bacteria in anaerobic processes, but also by termites, swamps and oceans. Methane retains heat much more than carbon dioxide, but its duration is shorter so it is less present in the atmosphere.

• Fluorinated greenhouse gases (HFCs) - This group is a group of gases that are produced only during industrial processes. They do not occur naturally, their source is human activity. Fluorinated greenhouse gases are a major hazard as their heat setting capacity is very high and they have a long duration and can remain in the atmosphere for thousands of years.



1 https://www.ekologia.pl/wiedza/slowniki/leksykon-ekologii-i-ochrony-srodowiska/gazy-cieplarniane

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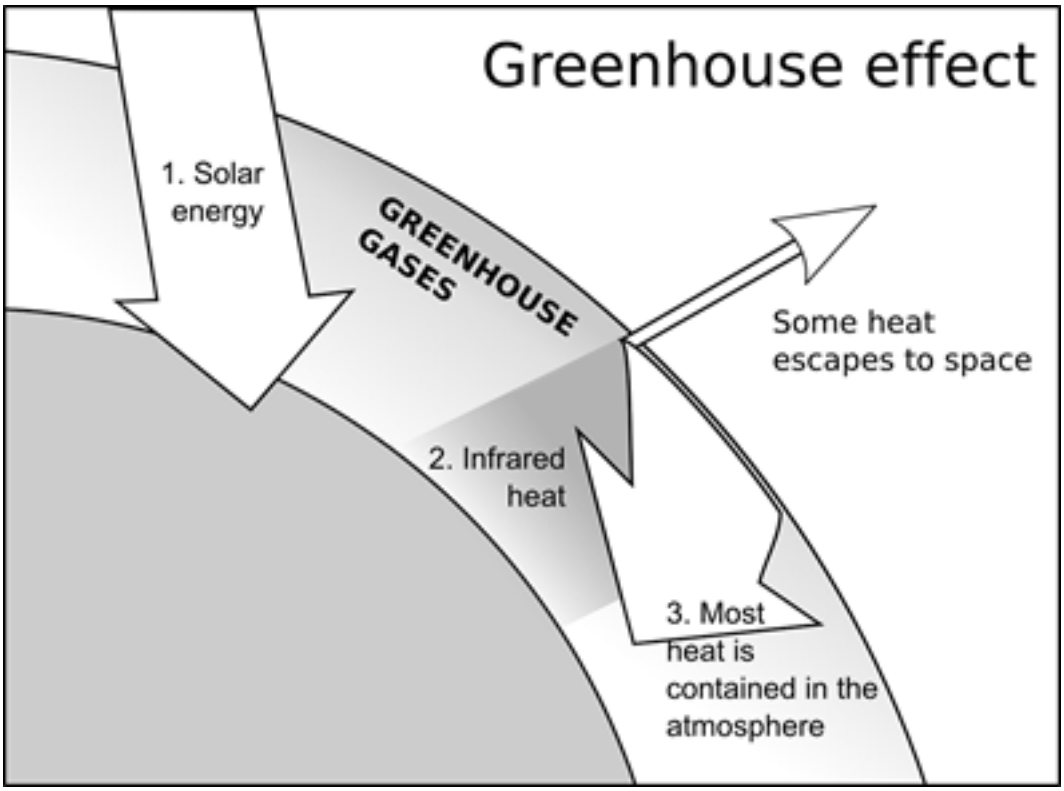
1.3 Greenhouse effect

Some of the greenhouse gases have been present in the Earth's atmosphere for millions of years and are a natural component of it. They have enabled the Earth's climatic conditions in which life has developed. However, as a result of human activity, non-natural gases have also appeared in the atmosphere, which makes the greenhouse effect worse.



Solar radiation, i.e. UV radiation (short-wave) partially reaches the Earth, but is mostly absorbed or reflected by the upper atmosphere layers. Close ultraviolet and visible radiation mostly reaches the Earth's surface, which it heats. The Earth then gives off heat in the form of infrared waves (long-term radiation). It is this heat that is absorbed by the greenhouse gases and thus is not released into space, but spreads in different directions, which creates the greenhouse effect.

1.4 Activities for reducing greenhouse gases

Good practice 1 – Nestlé

On 12 September 2019 Nestlé announced its intention to achieve zero net greenhouse gas emissions by 2050. This commitment includes a key objective of the Paris Agreement - to limit temperature increase to a maximum of 1.5°C. Over the last 4 years, Nestlé has acted in such a way as not to contribute to a temperature rise above 2°C. The company is determined to play a leading role in the fight against climate change. Over the next two years, Nestlé will develop a plan with interim targets along the 1.5°C path.

The fashion sector offers many possibilities of application of the 7Rs and is encouraged to handle the role of a pioneer in this field. At EU level for instance, the CIRCFASH call, launched by the European funding programme COSME, encourage the transnational partnerships between SMEs from the fashion sector to develop circular projects.

The company will review its progress annually to ensure that it is on track. To do so, the company will take the following steps:

- Accelerating the transformation of the product portfolio in line with consumer trends,
- Increasing the number of initiatives addressed to farmers to absorb more coal,
- Using 100% renewable electricity in Nestlé factories, warehouses, logistics and offices. [1]

Good practice 2 – Eco-design

Since 2007 Diehl Metering has been implementing eco-design as an approach to new product development. This consists of integrating the environmental impact of products in other projects, development and life cycle (sourcing, production, distribution, use and disposal). Eco-design has shown that replacing brass, traditionally used for meter housings, with a composite can reduce the carbon footprint of meters. Obtaining and processing brass consumes more energy than a composite and the end result is comparable. Moreover, the composite is lighter than brass, which has a positive effect on the transport of products. It cannot be denied that a lighter load requires less fuel, so greenhouse gas emissions are reduced.[2]

1 https://www.nestle.pl/media/pressreleases/allpressreleases/nestl%C3%A9-przyspiesza-dzia%C5%82ania-w-celu-przeciw-dzia%C5%82ania-zmianom-klimatu-i#
2 https://www.diehl.com/metering/pl/firma/odpowiedzialno%C5%9B%C4%87-spo%C5%82eczna/reducing-greenhouse-gases/

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Chapter 2 - Deforestation

2.1 Definition of deforestation

Deforestation is a process that reduces the forest area. This is due to excessive felling and firing. Deforestation affects the whole world, but it is happening very quickly in the tropics. Our forests are felled and burnt down to provide shelter and other basic human needs. A large proportion of the trees are processed into furniture, boards, paper or charcoal.

Deforestation also contributes to greenhouse gas emissions, about 20% of greenhouse gas emissions are due to the burning of tropical gases, which contributes to global climate change. In an area that is devoid of vegetation as a result of cutting down or burning trees, the earth heats up faster and harder, the absorption of solar radiation increases and water evaporates faster.[1]

1 https://www.forest-monitor.com/pl/wylesianie-na-kuli-ziemskiej-czesc-pierwsza/ https://www.forest-monitor.com/pl/wylesianie-na-kuli-ziemskiej-czesc-pierwsza/

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2.2 Causes of deforestation

The main causes of deforestation:

• Agriculture - agricultural activity is one of the main factors causing deforestation. The demand for food products is increasing, so more and more space is used for growing crops and grazing cattle.

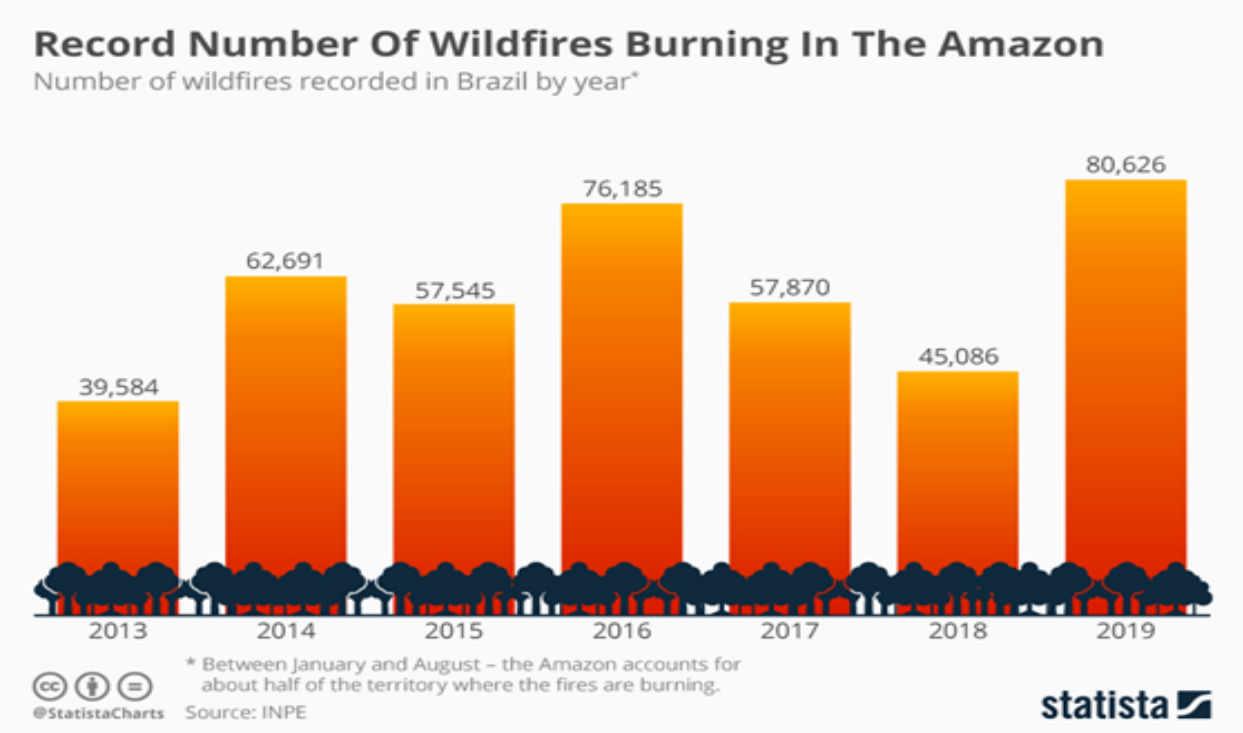
• Logging - Trees are used in the wood and paper industry, to make matches, furniture, etc. Wood is also used for firewood, some of the industries develop through illegal logging and felling of trees.

• Urbanization - to access the forests, roads are built; here too, trees are chopped up to create roads. Overpopulation also contributes to deforestation - as cities grow, more land is needed to create houses and settlements.

• Deserification of land - this process is partly natural. It occurs because the land is overused, making it unfit for tree growth. Many factories throw their waste into rivers, which causes soil erosion and makes it unfit for plant and tree cultivation.

• Mining - Oil and coal mining requires a significant amount of forest land. Mining waste pollutes the environment and affects nearby species.

• Forest fires - Hundreds of trees die every year because of forest fires in different parts of the world. The reason is an extremely warm summer and a milder winter. Fires caused by both human and nature cause huge losses in the forest cover.



Source: https://www.statista.com/chart/19089/number-of-wildfires-recorded-in-brazils-amazon-rainforest/

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2.3 Consequences of deforestation

Consequences of deforestation[1]:

• Climate imbalance - The trees provide shade, which maintains soil moisture and also releases water vapour in the air. Deforestation causes an imbalance in the atmospheric temperature. Felling has forced several species of animals to leave their native habitat, so some species have difficulties in surviving and adapting to new habitats.

• Increase in Global Warming - Trees play a major role in controlling global warming. They use greenhouse gases and restore balance to the atmosphere. Through deforestation, the proportion of greenhouse gases has increased, which has contributed to global warming.

• Soil erosion - When removing the tree cover, the soil is directly exposed to the sun, which causes it to dry out.

• Floods - During precipitation, trees absorb and store a large part of the water with their roots. Deforestation disrupts water flow and leads to flooding in some areas and drought in others.

• Wildlife Extinction - Various animal species are being lost due to deforestation. Over the last few decades our world has lost many species and plants.

1 https://www.conserve-energy-future.com/causes-effects-solutions-of-deforestation.php

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2.4 Deforestation – good practices

Good practice 1 – PEFC Pan-European Forest Certification

PEFC Pan-European Forest Certification - (Programme for the Endorsement of Forest Certification Schemes) is an independent non-profit organisation, established in 1999, whose main objective is to promote sustainable forest management through certification by entities independent of government and business. The PEFC certification on a product provides assurance that producers of wood and paper products or other forest products respect the highest social, ecological and ethical standards. The PEFC is a global organisation established for the assessment and mutual recognition of national certification schemes developed by many stakeholders, taking into account local specificities. Each national certification scheme must be examined and met with the approval of another country to participate. The PEFC covers more than 30 countries and 230 million hectares of forest (2/3 of the world's certified forests).

Good practice 2 – Plant a billion trees

The campaign was initiated by Nature Conservancy in 2008. Initially aimed at rebuilding the Atlantic forest in Brazil, they have now expanded their activities and are engaged in rebuilding forests in the United States and China. By planting trees and helping the forests to grow back where they have been severely degraded, they help to provide clean water, air, a variety of species and full, healthy forests for future generations.[1]

1 https://www.nature.org/en-us/get-involved/how-to-help/plant-a-billion/

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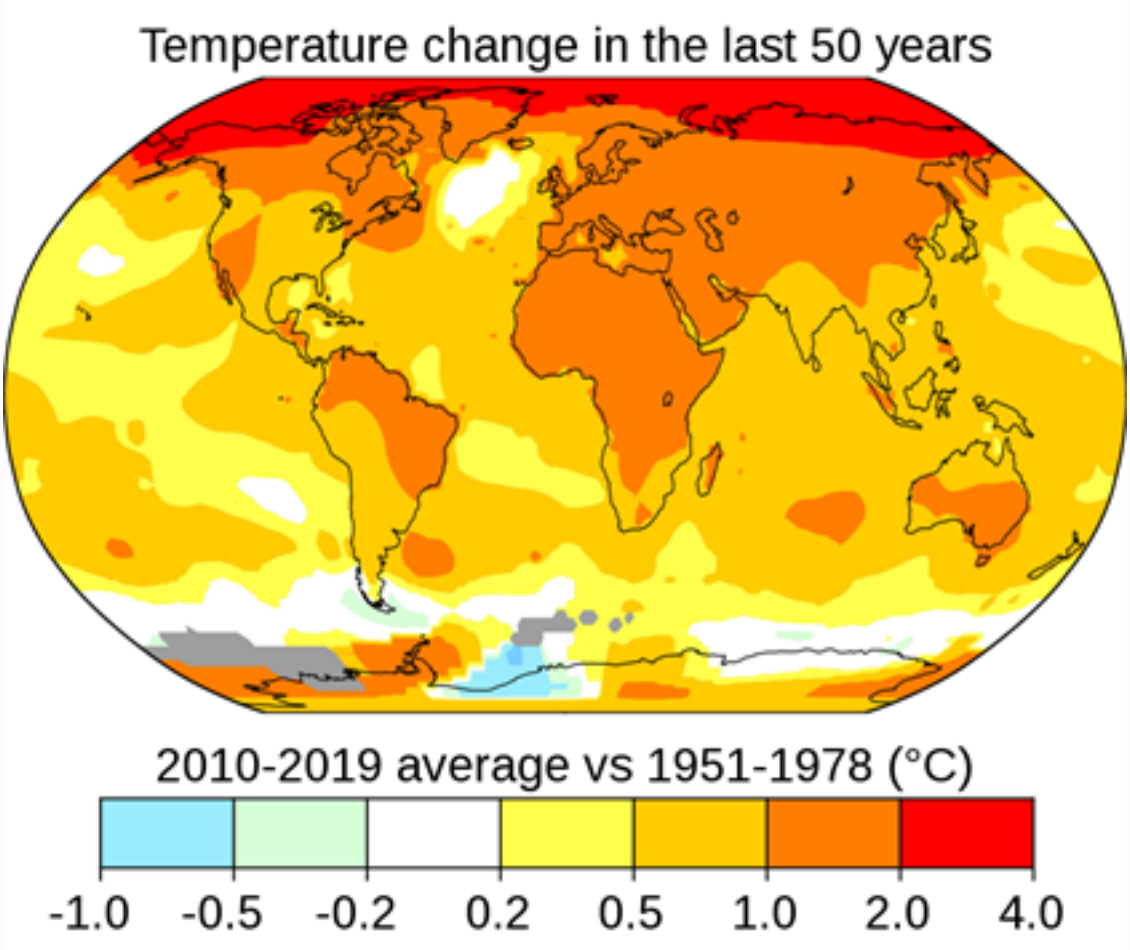
Chapter 3 - Evidence for rapid climat change

3.1 Global temperature rise

The average surface temperature of our planet has increased by 1.62 degrees Fahrenheit (0.9 degrees Celsius) since the end of the 19th century, mainly due to increased emissions of carbon dioxide and other greenhouse gases into the atmosphere. (NASA, 2019)



Source: NASA

3.2 Warming oceans

The oceans have absorbed much of this increased heat, and in the upper 700 metres (about 2,300 feet) of the ocean there has been more than 0.4 degrees Fahrenheit warming since 1969. (Levitus, S.; Antonov, J.; Boyer, T.; Baranova, O.; Garcia, H.; Locarnini, R.; Mishonov, A.; Reagan, J.; Seidov, D.; Yarosh, E.; Zweng, M. (2017).

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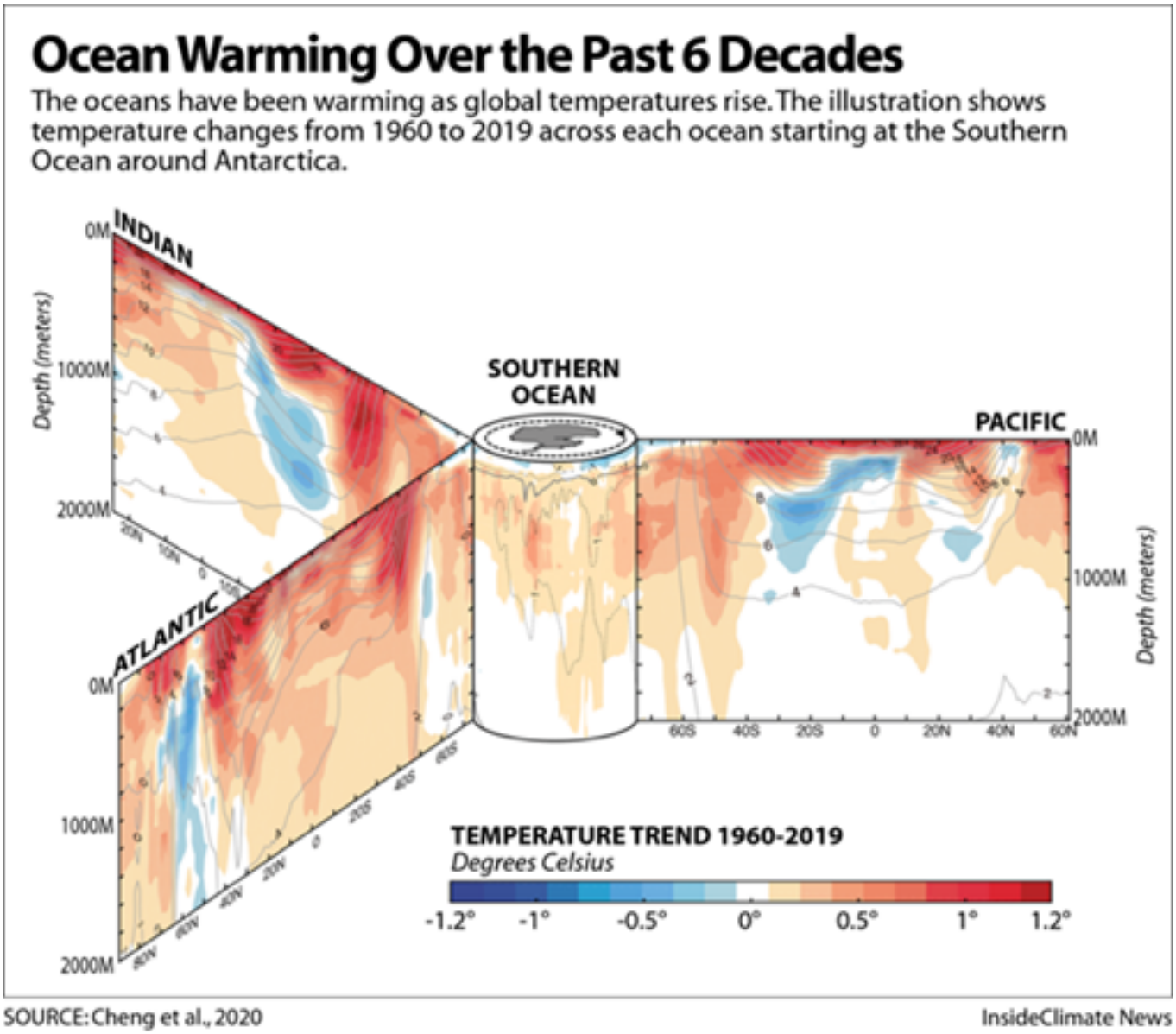
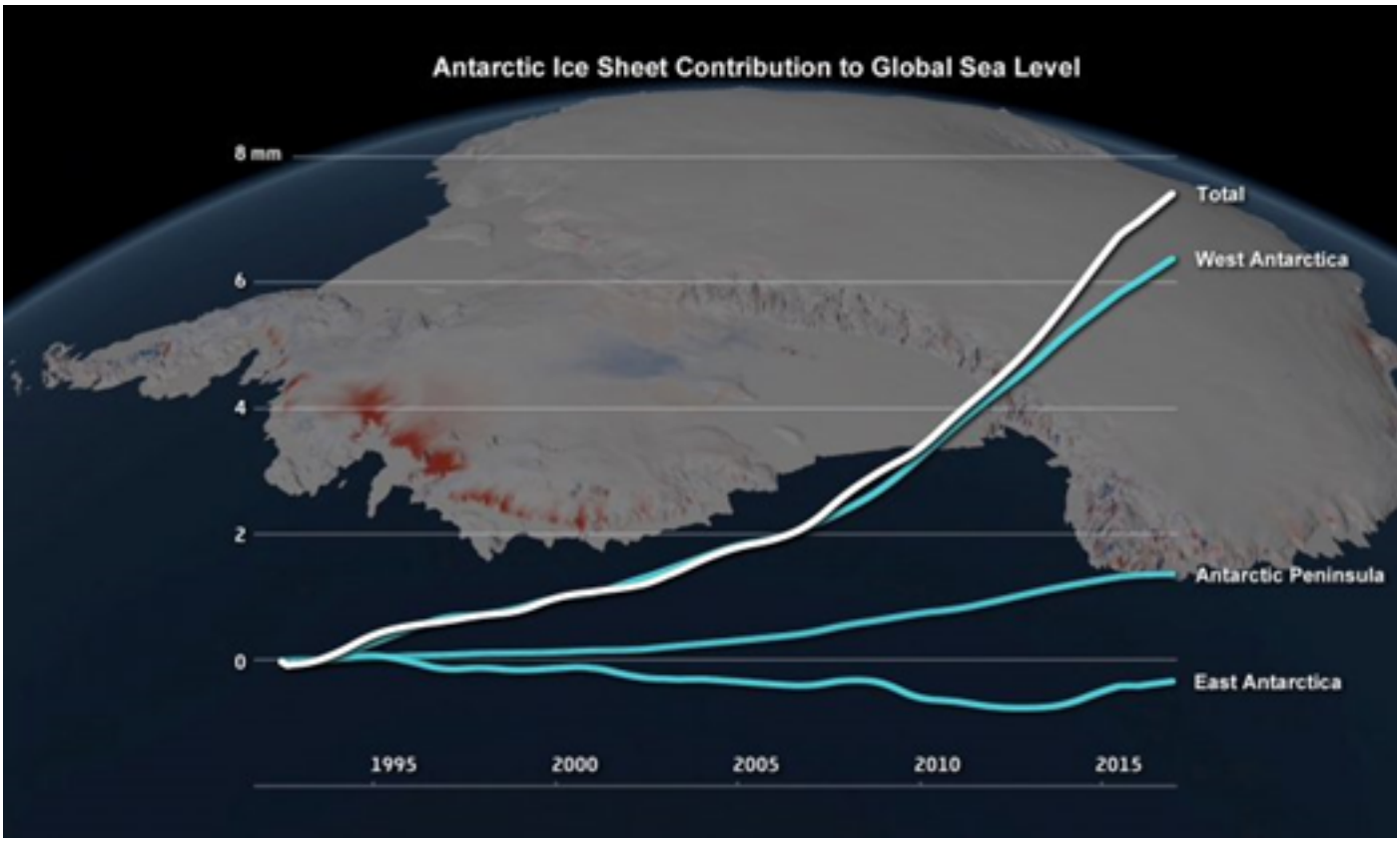


Source: https://insideclimatenews.org/news/14012020/ocean-heat-2019-warmest-year-argo-hurricanes-corals-marine-animals-heatwaves

3.3 Shrinking Ice Sheets

The Greenland and Antarctic ice coats have reduced their weight. Data from NASA's gravity and climate experiment show that between 1993 and 2016 Greenland lost an average of 286 billion tonnes of ice per year, while Antarctica lost about 127 billion tonnes of ice per year during the same period. The rate of ice mass loss in Antarctica has tripled over the last decade.[1]

1 https://www.jpl.nasa.gov/news/news.php?feature=7159



Source: https://earthsky.org/earth/ice-losses-antarctica-speed-up-sea-level-rise

3.4 Climat change – good practices

Good practice 1 – renewable energy

The use of renewable energy has many potential benefits, including reduced greenhouse gas emissions, diversification of energy supply and reduced dependence on fossil fuel markets (in particular oil and gas). The development of renewable energy sources also has the potential to stimulate employment in the EU by creating new green technology jobs. Almost 50 countries exposed to drastic climate change have agreed to produce 100% renewable energy by 2050 and t he rest of the world is actively developing solar, wind and geothermal energy.[1]

1 https://www.plattsinsight.com/insight/insight-magazine-apr-2020/?gclid=Cj0KCQjwupD4BRD4ARIsABJMmZ_rlx-

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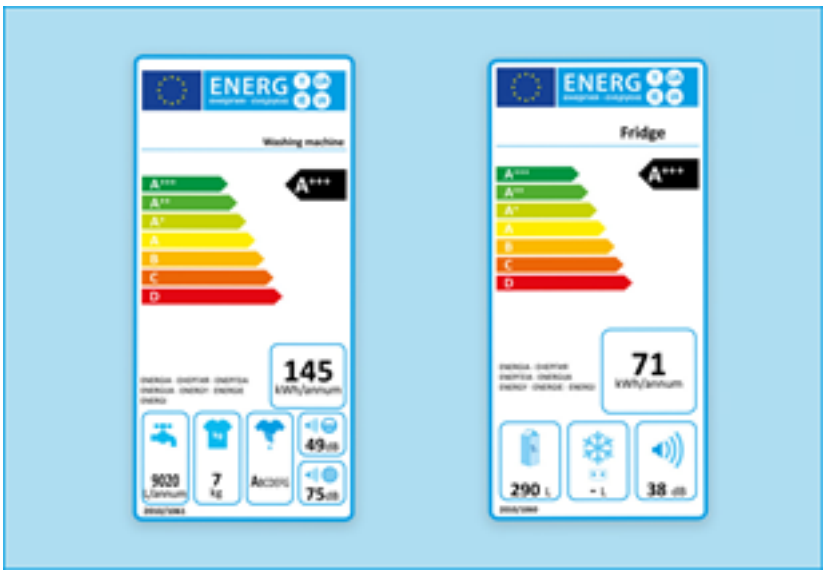
Good practice 2 - Energy Label

Energy labels enable consumers to choose a product that consumes less energy, saving them money. Labels can also encourage companies to invest in developing energy-efficient products. Energy labels show how much energy a device you sell or produce consumes, on a scale from A to G. Class A (marked green) means the lowest consumption and class G (red) the highest. Once most appliances of a given type have reached the A class consumption, the scale can now be increased by three more classes: A+, A++ and A+++. [1]



1 https://ec.europa.eu/energy/topics/energy-efficiency/energy-label-and-ecodesign/energy-label-generator_pl

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Chapter 4 – Impact on society

4.1 Communities

Global warming and its effects are felt in communities around the world. Increasingly frequent and intense weather and climate events are destroying our infrastructure and ecosystems that provide various benefits to communities. Future climate change is likely to cause many disruptions to you and community life. People on lower incomes have fewer opportunities to prepare for extreme weather and climate events. Global action to significantly reduce greenhouse gas emissions can significantly reduce climate risks and increase opportunities for these communities in the long term.

4.2 Economy

Rising temperatures, rising sea levels and extreme events will increasingly disrupt and destroy infrastructure, productivity and the vitality of our communities. Regional economies and industries dependent on natural resources and favourable climate conditions (e.g. agriculture, tourism and fisheries) are very vulnerable to climate change. Increased temperatures will reduce the efficiency of electricity production, but energy demand will be even higher, increasing the cost of electricity. Climate change will have a major impact on trade and the economy. With the steady increase in greenhouse gas emissions, annual losses in some sectors are projected to reach hundreds of billions of dollars by the end of the century.

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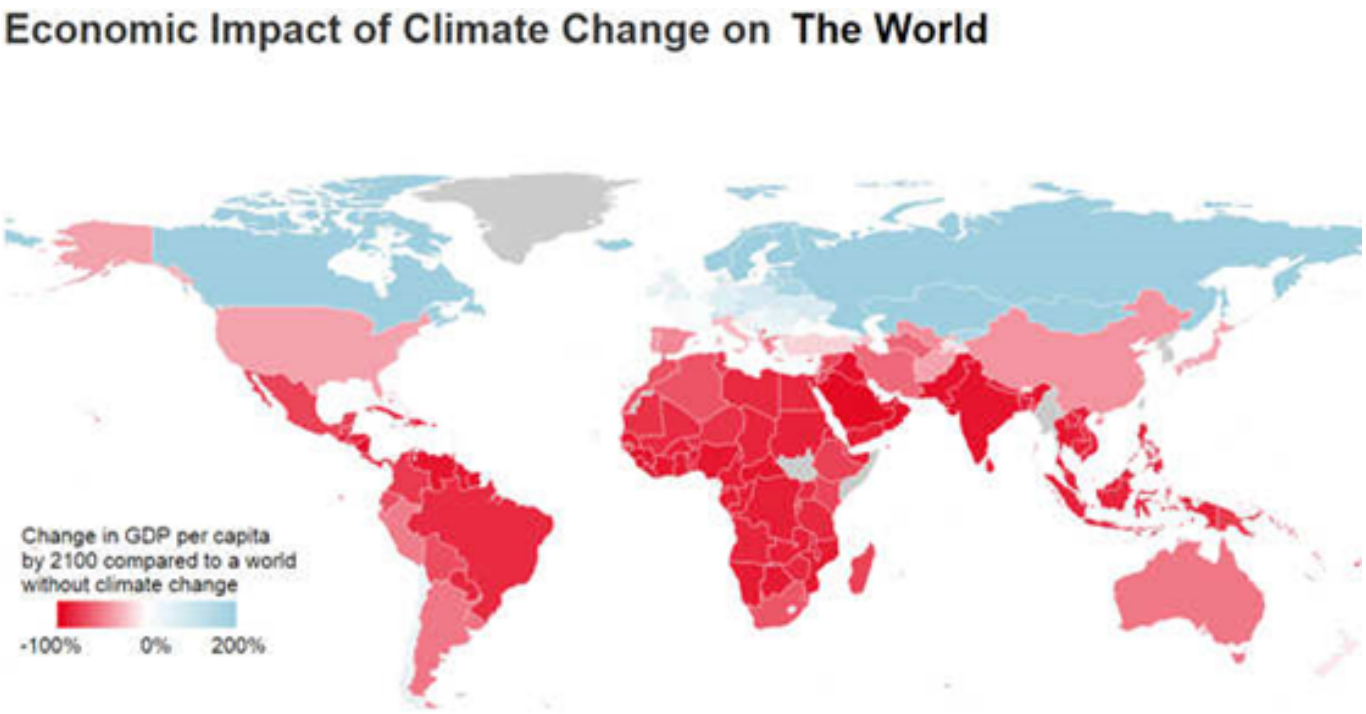


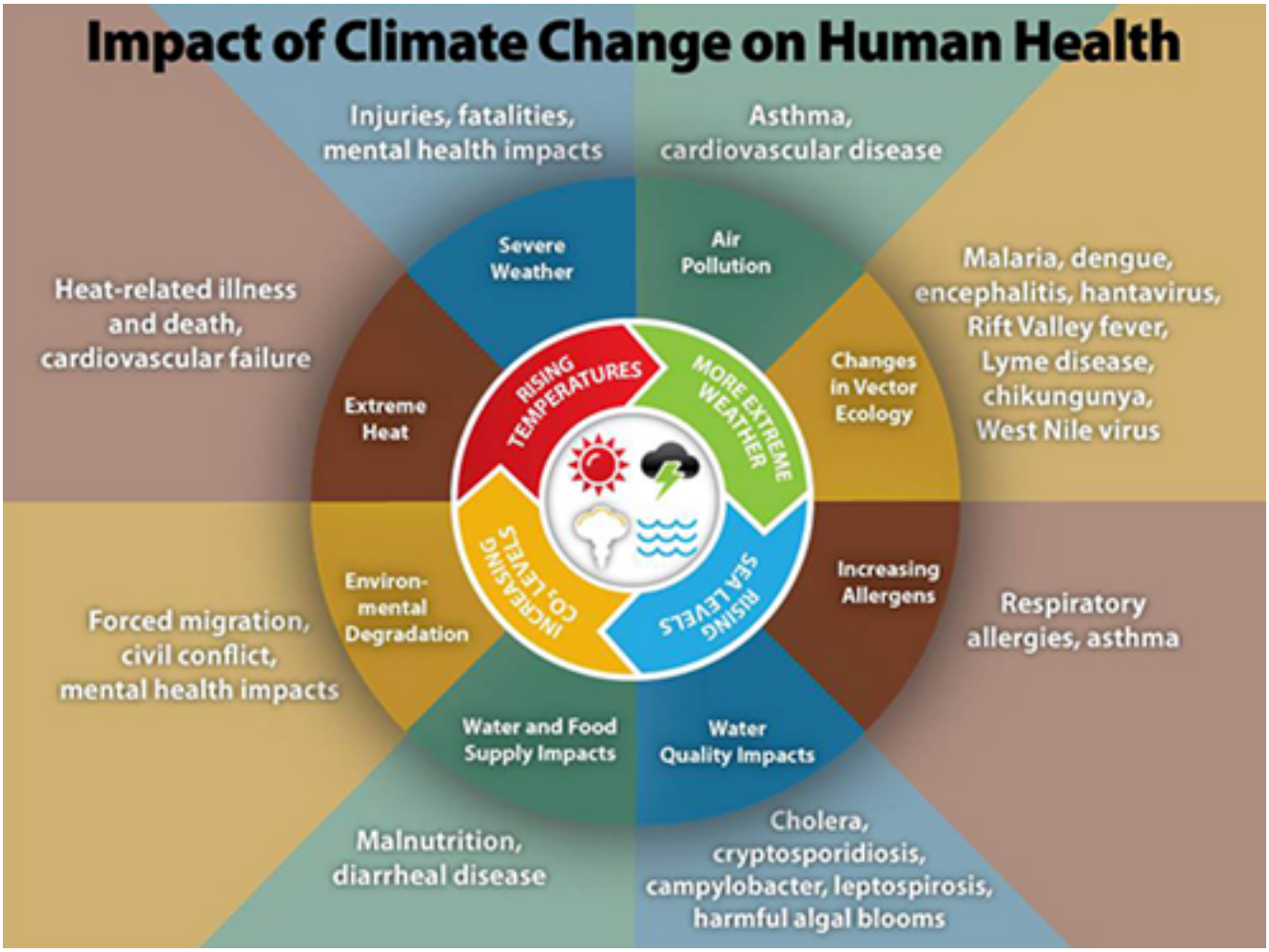
Source: Marshall Burke, Solomon M. Hsiang, Edward Miguel, "Global non-linear effect of temperature on economic production," Nature.

4.2 Health

Rising temperatures and precipitation change air quality increase health risks. Rising air and water temperatures and various intense extreme events will increase the number of diseases transmissible by food or water, which will affect food and water safety. As warming increases, the number of deaths caused by cold will decrease and the number of deaths caused by heat will increase. The number of deaths caused by heat is expected to be greater than the decrease in the number of deaths caused by cold. The frequency and severity of allergic diseases, including asthma and hay fever, will increase.

Climate change will also cause the distribution of insects and disease-carrying pests. More people will be exposed to ticks that carry Lyme borreliosis and mosquitoes that carry viruses such as Zika, West Nile and Dengue. Extreme weather events can also have an impact on mental health, particularly when they lead to degradation of livelihoods.

Adaptation and mitigation policies and programmes that help individuals, communities and countries prepare for the risks of climate change are reducing the number of injuries, diseases and deaths from climate-related health effects.



Source: https://www.cdc.gov/climateandhealth/effects/default.htm

4.4 Impact of society – good practices

Good practice 1 – WHO

The WHO European Regional Office for Europe is working to identify policy options to help prevent, prepare for and respond to the health impacts of climate change and is supporting Member States in selecting and implementing the most appropriate policies, actions and strategies. The Office supports Member States by building capacity to develop early warning and surveillance systems and to develop and run targeted campaigns to address the immediate and distant health consequences of climate change. [1]

Good practice 2 - Network for Greening the Financial System.

Central banks and financial supervisors in various countries are trying to develop principles for testing the resilience of banks and other financial institutions to climate change and encourage them to provide green credit. To achieve these objectives, eight central banks and supervisors have set up in 2017. Network for Greening the Financial System. The network currently comprises 42 institutions on five continents. Among them is the German Central Bank, which is conducting a programme to review strategies to support sustainable investment and is working on the next guide on greening financial markets.[2]

1 https://www.who.int/about/who-we-are/regional-offices
2 https://www.dnb.nl/en/about-dnb/co-operation/network-greening-financial-system/index.jsp

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Chapter 5 – Response options

5.1 Mitigation

Mitigation - efforts to reduce greenhouse gas emissions. The climate has changed irreversibly, our planet will continue to warm up due to past emissions.

Some climate impacts are unavoidable, but they can be mitigated. What you can do to reduce greenhouse gases? Here are some examples:

• Buy energy-Efficient Products - Many household appliances are available in energy-efficient models. For example, compact energy-saving light bulbs are designed to provide natural-looking light, with significantly less energy consumption than standard light bulbs.

• Use the 'Off' Switch - Save your electricity! Turn off the light when you leave the room, remember to turn off the computer.

• Reduce, Reuse, Recycle - Buy products that do not have large packaging, so you will contribute to reducing waste. Recycling half the household waste saves 2,400 pounds of carbon dioxide per year.

• Plant a tree - If you have the possibility, plant a tree. The trees absorb carbon dioxide and release oxygen. A single tree will absorb about one tonne of carbon dioxide during its lifetime.

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5.2 Adaptation

Adaptation through climate impact planning and resilience. Adaptation will help to reduce the damage associated with climate change and will also help to deal with existing threats from current weather trends, natural and human-made disasters. Adaptation has limitations and disadvantages. Some climate impacts may be too large to be addressed through adaptation.

Implementation of adaptation policies requires consideration of location-specific factors, as the effects of climate change may vary from one geographical location to another. As a result, centralised policy action may be somewhat more limited for adaptation than for mitigation or geoengineering.

5.3 Geoengineering

Geoengineering is deliberate manipulation of the climate system. The purpose of geoengineering is to counteract the effects of greenhouse gas emissions by humans or their effects. Geoengineering has the potential to help reduce the concentration of greenhouse gases in the atmosphere, to counteract the physical impact of an increase in the concentration of greenhouse gases, to counteract specific effects of climate change or to offer strategies when sudden, catastrophic or otherwise unacceptable effects of climate change become evident.

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5.4 Response options – good practices

Good practice 1 – Nike

Nike has created the „Nike Better World" campaign to promote recycling. The company stresses that recycling, like sport, can change our lives for the better. Nike uses used materials to create new sports shoes. The company has also introduced new shipping packaging, which is produced with limited carbon emissions, from FSC-certified material, which means the box is recycled and the wood comes from properly managed forests.

Source: https://dailyweb.pl/nike-space-hippie/

Good practice 2 – TCF and PCF

TCF (Totally chlorine-free bleaching), PCF (Processed chlorine-free bleaching) - the use of chlorine for paper bleaching can lead to the formation of toxic and carcinogenic dioxins and furans. Therefore, chlorine-free paper bleaching and processing technologies have been developed and are referred to as TCF or PCF.

https://www.upmraumacell.com/newsroom/2019/03/your-natural-choice-our-tcf-fluff-pulp-bleached-without-any-chlorine/

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Chapter 6 – JOIN THE MOVE

- Existing networks and supporting programmes

http://www.climatenetwork.org/ - Climate action network

https://ec.europa.eu/clima/policies/eccp_pl - European Climat Change Programme

- Tools of reference to develop actions

https://www.climatelinks.org/resources/agriculture-and-land-use-national-greenhouse-gas-inventory--alu-software - Agriculture and Land Use National Greenhouse Gas Inventory (ALU) Software

http://www.afolucarbon.org/ - Agriculture, Forestry, and Other Land Use (AFOLU) Carbon Calculator

https://cgspace.cgiar.org/handle/10568/67027 - CCAFS Mitigation Options Tool (CCAFS-MOT)

https://www.cleertool.org/ - Clean Energy Emission Reduction (CLEER) Tool

https://www.globalforestwatch.org/ - Global Forest Watch (GFW) and GFW Climate

https://www.i-jedi.org/index.html - International Jobs and Economic Development Impacts (I-JEDI)

Recommendations[1]:

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

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

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

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

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

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

Quotes from entrepreneurs or youth having taken relevant actions:

"Climate change is the greatest threat to our existence in our short history on this planet. Nobody's going to buy their way out of its effects." - Mark Ruffalo, Actor & Environmentalist

"I hope to use my celebrity to motivate people and contribute to moving our global society back from the brink. I am surprised environment is not at the top of the agenda. What is more important than good and clean air?" -Don Cheadle, Actor & UN Environment Goodwill Ambassador

„It's important for me to have hope because that's my job as a parent, to have hope, for my kids, that we're not going to leave them in a world that's in shambles, that's a chaotic place, that's a dangerous place." - James Cameron, Film Director

"Let's double down on solar energy, let's be more energy-efficient, let's weatherize our homes. We can build a better, healthier economy based on good-paying, clean energy jobs." - Ian Somerhalder, Actor

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Chapter 7 – TO GO FURTHER

https://climate.nasa.gov/evidence/ - Climat change – How do we know?

https://climatepolicy.org/index.cfm/climatepolicy/the-basics/there-are-many-possible-policy-responses/ - Possible policy responses

https://www.globalchange.gov/climate-change/response-options - Response options

http://www.eastgwillimbury.ca/services/Environment/Ten_ways_to_Reduce_Greenhouse_Gases.htm?PageMode=Print – 10 ways to reduce Greenhouse Gases

https://www.conserve-energy-future.com/phenomenal-ways-to-stop-deforestation-and-protect-our-planet.php - 15+ Phenomenal Ways To Stop Deforestation and Protect Our Planet

https://www.conserve-energy-future.com/causes-effects-solutions-of-deforestation.php - Deforestation: Compromises of a Growing World

https://www.environment.gov.au/climate-change/climate-science-data/climate-science/greenhouse-effect - Greenhouse effect

https://www.yaleclimateconnections.org/2019/10/12-major-climate-change-reports--from-2019/ - 12 major climate change reports from 2019

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Chapter 7 - PRACTICAL ACTIVITIES

Activity 1. How many CO2 do you utilize?

Analyse energy consumption of a hypothetical household and determine the amount of carbon dioxide you are adding to the atmosphere each year.

Here, you can find a template, which will help you to calculate how much CO2 you utilize in a month and in a year: https://scied.ucar.edu/sites/default/files/images/activity/co2_spew.pdf

Activity 2. Quiz

1. Greenhouse gases are components of the Earth's Atmosphere
a. Yes
b. No

2. The main causes of deforestation are:
a. Temperature
b. Logging
c. Agriculture
d. Atmosphere

3. The average surface temperature of the planet has:
a. Increased
b. Decreased

4. Does global warming have an impact on the society?
a. Yes
b. No

5. What are the response options?
a. Mitigation, Adaptation, Agriculture
b. Geoengineering, Deforestation, Geoengineering
c. Mitigation, Adaptation, Geoengineering

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Conclusion: This is a beginning - My action

We've given you some advice; now it is time to turn this info into action… your action!
Write here your own remarks: