Think Differently
& Act Differently

THINK DIFFERENTLY & ACT DIFFERENTLY

CHAPTER I

The impact of daily activities on the environment

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A. TEORETICAL FRAMEWORK

(realized by Ass. Animam Viventem)

Introduction

One of the issues that defines our time is climate change. Based on numerous lines of evidence, it is now clearer than ever that humans are altering Earth's climate. In the last decades, we saw a sea level rise, a sharp loss in Arctic sea ice, the atmosphere and oceans have warming and other climate-related changes.

The effects of climate change on people and the environment are becoming more obvious every year. Unprecedented heat waves, wildfires, and flooding have caused billions in losses. In reaction to shifting temperatures and precipitation patterns, habitats are altering quickly.

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The environment and the space we degrade

First of all, our planet, Earth. The only place we are currently aware of where there are living things is our home planet, which is the third planet from the Sun. Earth is the only planet in our solar system having liquid water on its surface, while being only the fifth largest planet overall. Earth is the largest of the four planets nearest to the Sun, all of which are composed of rock and metal, and is only slightly larger than adjacent Venus.

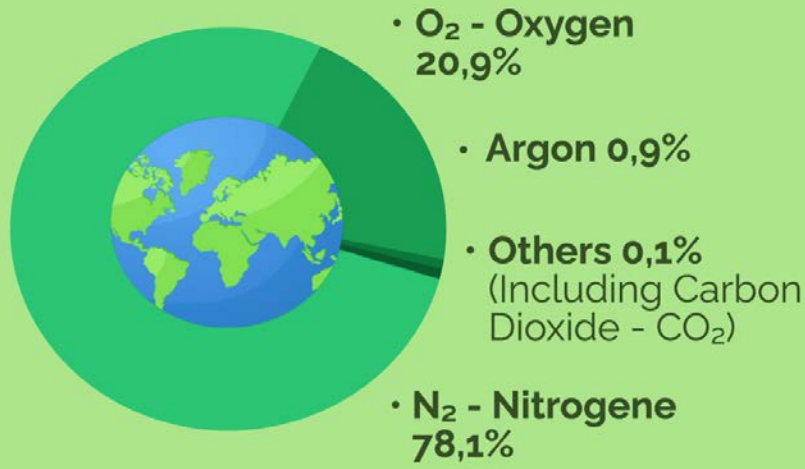
Around 4.5 billion years ago, when the solar system was formed in its current configuration, the third planet, Earth, was created when gravity drew spinning gas and dust in. Earth has a solid crust, a rocky mantle and a central core, just like its sibling terrestrial planets.

Earth features mountains, valleys, and volcanoes just like other planet in our solar system. Nearly 70% of the surface of the world is made up of the global ocean, which has an average depth of around 4 kilometers.

70% of the Earth's surface is covered in water

Earth's atmosphere is made up of 78% nitrogen, 21% oxygen, and 1% additional gases like neon, carbon dioxide, and argon near the surface. The atmosphere influences both the short-term and long-term local weather on Earth and protects humans from the majority of dangerous solar radiation. Additionally, it shields us from meteoroids, the majority of which burn up in the atmosphere before striking the surface as meteorites and appearing as meteors in the night sky.

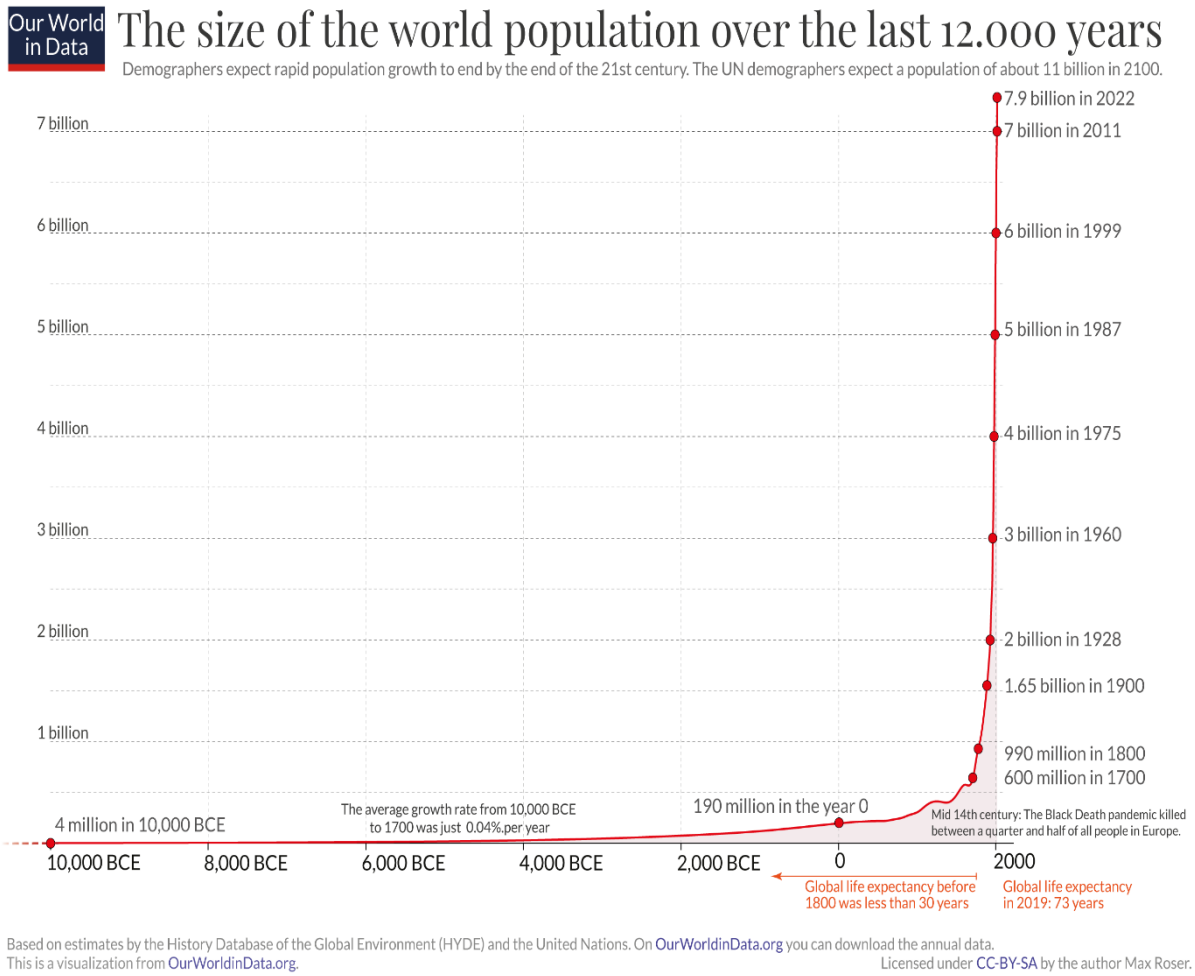
Earth's favorable climate and chemical composition have led to an abundance of life on this planet. Most importantly, since the temperature permits liquid water to exist for long periods of time, Earth is unique in that the majority of our planet is covered with liquid water. Around 3.8 billion years ago, the huge oceans of Earth provided an ideal setting for the emergence of life.



All these factors lead to a great biodiversity on Earth. Every living creature, including plants, microorganisms, animals, and people, is referred to as biodiversity. Around 8.7 million species of plants and animals are thought to exist, according to scientists. However, so far, only about 1.2 million species have been recognized and described. This implies that the identities of millions of other creatures are yet unknown.

One of the known species it's us, humans. On Earth, humans evolved from extinct apes. When seen from a zoological perspective, we are considered to be Homo sapiens, an upright, ground-dwelling species that most likely first appeared around 315,000 years ago.

In the year 10,000 B.C. there were only 5–10 million humans on Earth, at the time of the Agricultural Revolution. The Industrial Revolution started in 1800, when



there were roughly 1 billion people on the planet. In the 19th century, population increase was fueled by continued agricultural expansion, the extraction of fossil fuels, and the mining of minerals. In just a little over 200 years, the human population has increased by almost 6 billion and today the human population is around 7.9 billion.

That huge population spike in such a small period of time caused a big problem. To feed all that population, humans had to take over the nature, forests turned into agricultural fields, natural habitats were destroyed for cattle production, the seas turned into fishing grounds and villages turned into big industrial cities.

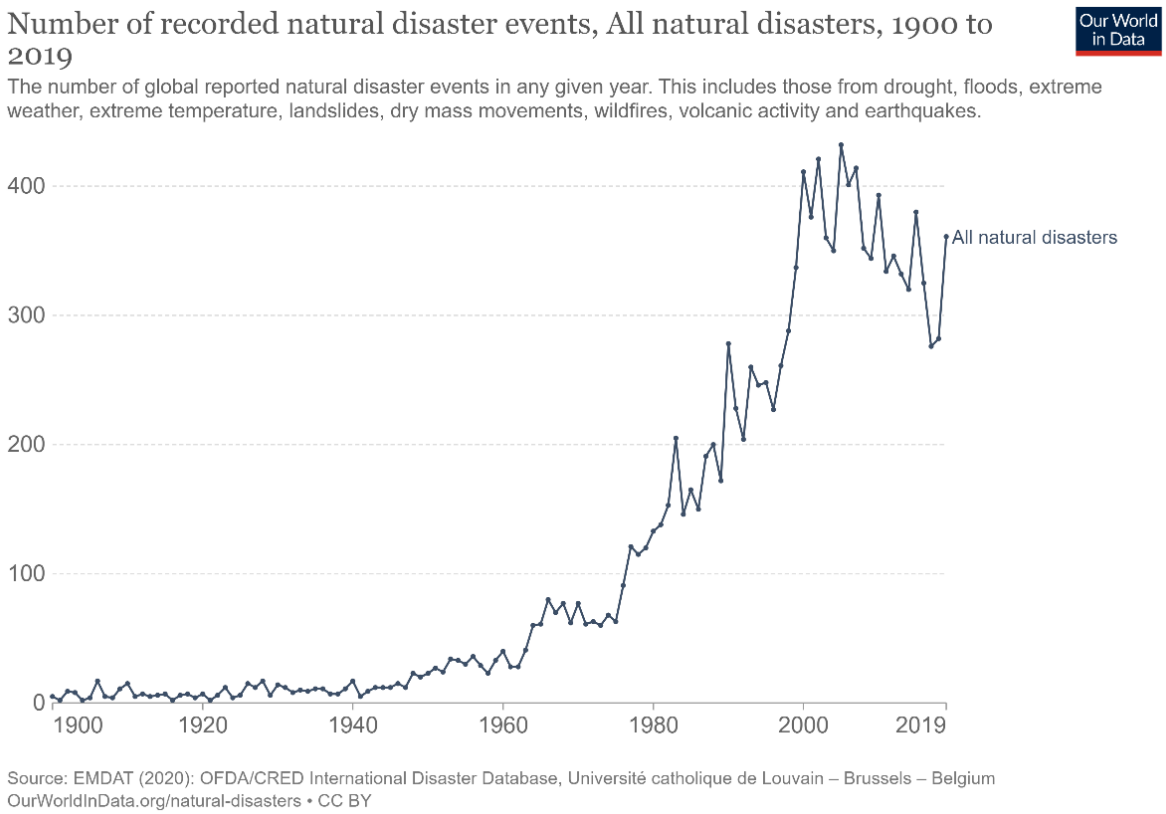
Such a big development in such a small period of time led to harmful emissions that are in such big quantities that nature cannot intake and it's causing the climate emergency the planet is enduring right now.

The Environment

The environment is not static, it can change due to natural and/or anthropogenic causes, that is, natural or human.

Natural Causes

There are several natural causes that have affected the environment of this planet for millions of years, volcanic eruptions, earthquakes, hurricanes, floods, forest wildfires, sandstorms are just some of them and they all affect the environment. However, they had very different consequences before and after the human population growth.



All these natural disasters weren't problematic for the environment before humans appeared. Volcanic eruptions created new islands and habitats, and the ash from the volcanic eruption is extremely fertile and nutritious for the habitats because of key nutrients, such as iron, calcium, magnesium, sodium, potassium and many others.

Floods distribute and deposit river sediments over large areas of land flooded with fresh water. Additionally, they transport and drop nutrient-rich sediments into those wetlands, where they support both plant and animal life.

Forest wildfires are very helpful in some ways, low-growing underbrush is eliminated, the forest floor is cleared of dead trees and leaves, it is exposed to sunshine, and the soil is nourished by these forest wildfires. Existing trees can get stronger and healthier by reducing this competition for resources.

And sandstorms in Africa transport nutrients across the Atlantic Ocean and nourished South American forest soil like the Amazon.

However, today some of these events occur with much higher frequency than before human population spiked becoming disadvantageous and destructive for habitats, animals and humans. [1]

Anthropogenic Causes

Is the human action on the environment. These changes were insignificant in the past, however from the 19th century and more specifically the 20th century they gained importance, due to the increase in population and increase of the consumption.

Since the earliest ancestors of our species, human activity has had an impact on the environment. Since the beginning of Homo sapiens' existence on the planet, humans have changed the environment around us through farming, travel, and eventually urbanization and economic networks. The extent of our impact on the environment at this time in the physical history of the globe leads experts to conclude that there is no longer "pristine nature," or ecosystems free from human interference. [2]

Agriculture and Domesticated Animals

Agriculture, the first significant human invention that enabled our survival as a species, has made notable advancements thanks to the need to feed a growing human population. Hunter-gatherer civilizations were able to settle and grow their own food thanks to early agriculture. By introducing non-native species to new habitats and favoring the cultivation of particular plants and animals over others, this had an immediate negative influence on the environment.

The domestication of animals and other species had a tremendous negative impact on the ecosystem by changing the land. Grazing animals caused soil erosion and the loss of native

grasses, which contributed to environmental change. And we now know that changes in the composition of gases in the atmosphere have been significantly impacted by the rapid increase of cow numbers to fulfill human nutritional demands. [3]

Deforestation

As more people must be accommodated, cities and dwellings must be built in larger spaces. In order to produce building materials and make place for urban and suburban expansion, this frequently implies removing forests.

Numerous consequences of deforestation include reduced oxygen levels (and an increase in greenhouse gases), a higher risk of soil erosion, and the destruction of animal habitats.

Around the world, up to 15 billion trees are presently cut annually. Simply said, it's neither wise or sustainable for people, animals, or the environment. [4]

Rainfall patterns, the quality of the water and soil, and flood protection are all significantly influenced by forests. Forests directly support the homes and livelihoods of millions of people.

Air Pollution

By contributing to air pollution, or the release of dangerous compounds into the atmosphere, human activities have an impact on the ecosystem. Although it can be challenging to determine which pollutants are linked to particular effects on the environment or public health, it is widely acknowledged that air pollution can have negative effects on both plant and animal life in addition to public health issues.

Air pollution is only one type of pollution. It can originate from human waste, industrial chemicals, or other sources and have an impact on soil or rivers. These pollutants can have a significant negative impact on the environment, causing issues like acid rain and hazardous algae growth in the ocean as well as environmental damage.

Our consumption of fossil fuels and its associated CO_2 emissions is one of the most significant ways that people have impacted the environment. Recent research shows that CO_2 emissions are linked to the loss of the carbon-sink effect of forest lands (due to deforestation) and the presence of particulate matter in the air. This is especially true when emissions are combined with emissions and the existing particulate matter in the air and the deterioration of the earth's ozone layer.

Water Pollution

Water pollution refers to the contamination of water with an excessive amount of a substance that could be harmful to both people and the environment. The quantity of the pollutant, its effect on the environment, and how the water is used all affect how polluted the water is. Chemical, biological, or physical processes can produce pollutants. Water contamination can occasionally result from natural processes like volcanic eruptions or evaporation, but most pollution comes from human land-based activity. As the water containing the pollutants advances through the water cycle, contaminants will travel with it.

The contaminants may reach the water directly through both legal and unauthorized factory discharges, as well as inadequate water treatment facilities. Water supplies can be harmed by spills and leaks from oil pipelines and ships. Debris can enter rivers due to wind, storms, and littering, especially when it comes to plastic waste.

All the causes described above led to what we call today the climate emergency. Climate has always had an impact on people. Despite the affluence and technology of contemporary industrial nations, climate continues to have a fundamental impact on human well-being. The location of a person's home, their diet, their means of transportation, and their leisure activities are all influenced by the climate.

Climate controls how food is produced, how much water is available, how much energy is used, how diseases spread, and other factors that affect human health and well-being. Additionally, it has an impact on the ecosystems' capacity to produce products and services for both people and the other species with whom we coexist on the planet. Human actions are also having an impact on climate. The scientific evidence that the Earth is warming is now overwhelming, as will be covered in the chapters to follow. Numerous pieces of evidence also show that human actions, particularly the burning of fossil fuels and other activities that produce heat-trapping greenhouse gases into the atmosphere, are the primary cause of this warming.

Future climate change projections show that unless large and persistent steps are done to reduce greenhouse gases emissions, Earth will continue to warm. Increases in sea level, changes in ocean chemistry, and variations in the frequency and severity of heat waves, precipitation events, and droughts are just a few of the numerous connected and interacting changes in the Earth system that are being caused by rising temperatures and greenhouse gases concentrations.

The natural and human systems are both significantly at danger as a result of these changes. We can reasonably anticipate that the effects of climate change will be more severe if actions are not taken to limit its magnitude and adapt to its impacts, even though the specifics of how the future impacts of climate change will manifest themselves are not as well understood as the fundamental causes and mechanisms of climate change.

Consumption of Natural Resources

Exploitation of Natural Resources

Utilizing natural resources for economic gain is known as "exploitation," which occasionally carries a negative connotation of resulting environmental deterioration. As the extraction and processing of raw resources (such as in mining, steam power, and machinery) advanced significantly more than in preindustrial areas, it began to take on an industrial scale. The 20th century saw a sharp rise in energy usage. Fossil fuels, which include oil, coal, and natural gas, are currently responsible for about 80% of the world's energy consumption.[5]

Natural resources are being strained more and more each year on a global scale as more people claim the consumption and demand a higher standard of living. The resources of the globe are suffering greatly as nations look for new resources to plunder.

The depletion of natural resources is a genuine issue that is raising concerns throughout the world because there isn't enough focus on making new resources available and conserving what is already there. These resources are declining at worrisome rates and there are no indications that Earth's population are even aware of the threat they face or the urgency of averting a catastrophe. Water, fossil fuels, forest reserves, sand, and suitable agricultural land are all depleting more quickly than they can be used.

The use of practically all natural resources is under intense pressure as the human population continues to increase.

The natural resources are frequently overused as a result of this. To make matters worse, overuse to meet the requirements of an expanding population has led to a dramatic decline in the availability of finite natural resources such arable land, coral reefs, fresh water, fossil fuels, and a variety of plants in forests. Due to competing demands on the essential resources necessary to maintain life, the quality of life has drastically declined. Overpopulation causes the depletion of natural resources including food, natural water, gas, and so forth.

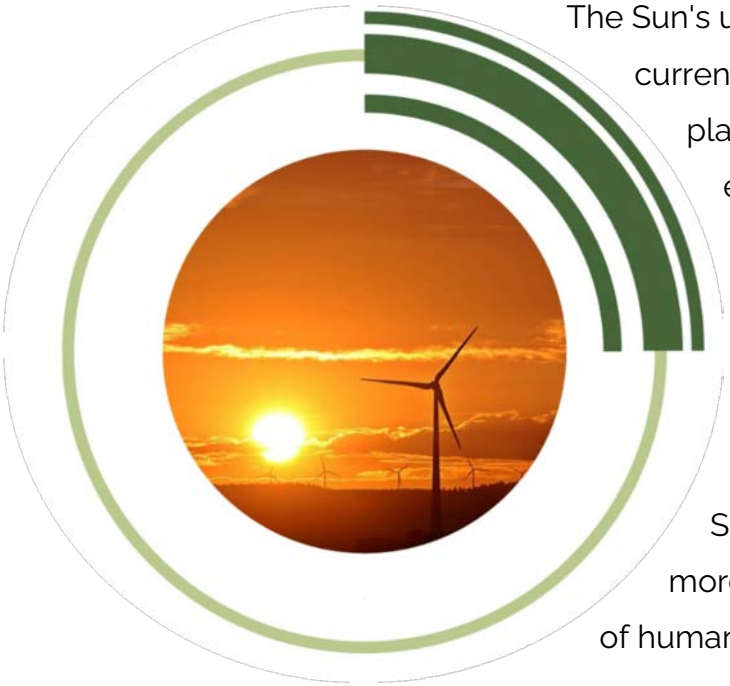
What Are Natural Resources?

Natural resources are anything that our earth provides without the help of humans. They essentially ensure our survival here on earth, but if they are used up quicker than they can replenish, they can run out. These resources may be replenishable or not.

There are three types of natural resources: those that are perpetually renewable, intermediately renewable that are limited, and non-renewable.

Perpetually Renewable Resources

The simplest resources to comprehend are those that are perpetually renewable; these are natural resources that the Sun and the Earth's natural processes continuously replenish.



The Sun's unending energy drives the winds, ocean currents, precipitation, and the majority of the plant life on Earth along with geothermal energy (heat from the Earth's interior). The electrical networks of many countries are currently powered by a sizeable and increasing portion of solar and geothermal natural resources. It is eternally renewable in the sense that the Sun and the Earth will always produce more, no matter how much we utilize in terms of human timescales.

Limited Renewable Resources

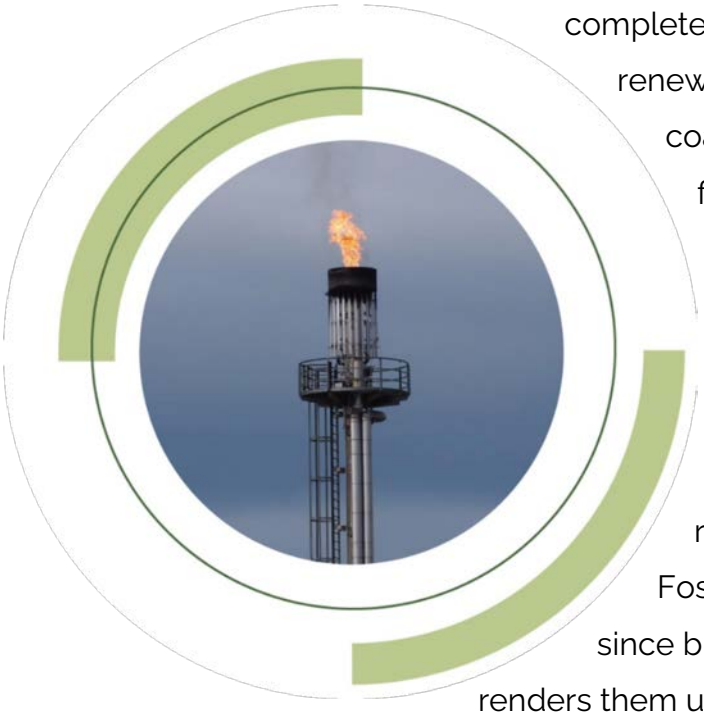
Only if we don't consume them too soon can limited renewable resources remain renewable. They include things like soil, freshwater, crops, and timber-producing trees. They would always be there if we didn't utilize them, but because they take time (on our timelines) to grow or regenerate, we can use them excessively until they run out.

A wonderful case of a finite renewable resource is freshwater. The sun evaporates water from the surface of saltwater oceans, which then travels over land and returns to earth as freshwater rain through the water cycle.

The lakes, rivers, and aquifers that we use for drinking water, industry, and agriculture are filled by this rain. We won't run out of freshwater if we use it at the same pace that rain replenishes it. We will run out of freshwater if we use it more quickly than it can replenish. In order to prevent their depletion, intermediate renewable resources must be carefully maintained.

Non-renewable Resources

The non-renewable category of natural resources is the third. On a human time scale, these resources won't regenerate. Once they are used up, no more will be produced and they are no longer available. Fossil fuels, so named because the majority were produced through processes that take millions of years to complete, are the most prevalent instances of non-renewable resources. Crude oil, natural gas, coal, and uranium are examples of fossil fuels. Other non-renewable resources include metals, lithium, and rare-earth elements (REEs). However, it's crucial to keep in mind that, even if we may someday run out of mineable metals and REEs, they can still be recovered through recycling if trash is properly managed. Fossil fuels, on the other hand, are different since burning them changes their chemistry and renders them unusable.



The importance of the Limited Renewable Resources

All these limited resources are extremely important and need to be carefully monitored. Humans have been using them for thousands of years with no long lasting effects on nature, however with the population increase in the last century the use of these resources became very unbalanced and are under threat. Freshwater, oceans, forests and land need to be utilized with caution for them to keep providing what they have been providing for centuries and to survive the threats they face today.

Freshwater

WHAT IT GIVES US	THREATS
Human Life **Food** **Wildlife** **Health & Cleanliness** **Energy** **Growth (business and economies depend on water)**	Climate change Over-allocation/Growing demand/population growth/changing consumption patterns/Unsustainable use Unsustainable agriculture Pollution Energy generation Unsustainable aquaculture Infrastructure Navigation

Oceans

WHAT IT GIVES US	THREATS
Climate control and protection **Food** **Wildlife**	Climate change Illegal, unregulated and unreported Fishing Overfishing Pollution

Forests

WHAT IT GIVES US	THREATS
Products made from the wood or rubber of trees **Wildlife** **Food** **Fuel** **Medicine** **Fresh air** **Clean water** **Sequestering carbon**	Unsustainable agriculture Unsustainable and illegal logging Mining Urban expansion Infrastructure (e.g., roads built through forests)

Land

WHAT IT GIVES US	THREATS
Forests, mangroves, grasslands and other terrestrial ecosystems **Wildlife habitat** **Greenhouse gas and carbon storage** **Freshwater storage and filtration** **Healthy soil for crop production**	Energy generation Manufacturing Deforestation Transportation

Overexploitation of Natural Resources

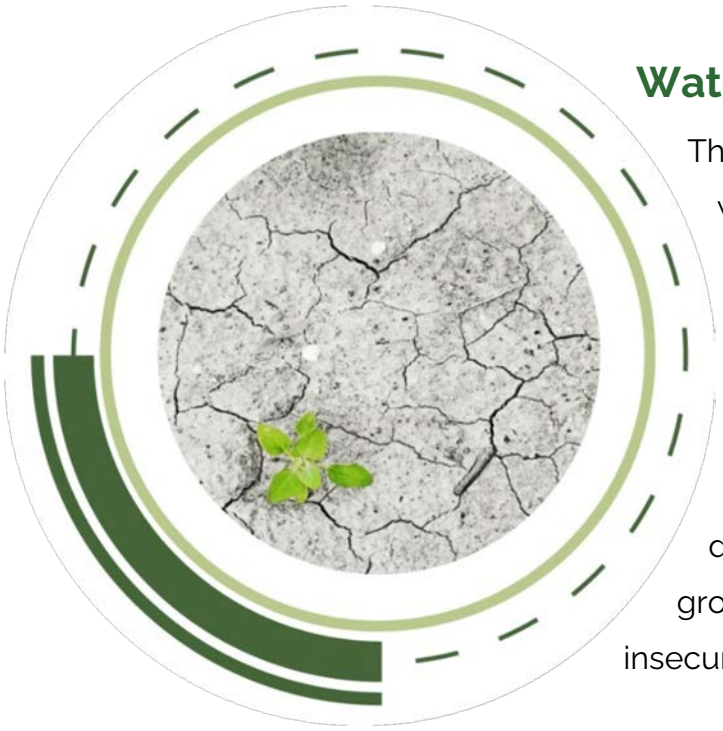
Natural resources have been exploited by people for the materials needed to support life ever since they have existed. Food production and economic survival are the two main aspects of it, while other materials are also taken from the environment. But human exploitation of natural ecosystems has a permanent impact on how resources and other ecosystem services will be provided in the future.

Overexploitation damages ecosystems over time, and some may never fully recover even after exploitation is halted. That could have a negative effect on the accessibility of resources like food, clean air, and other services, ultimately endangering the survival of humans. Unfortunately, the majority of nations struggle to ensure the sustainable use of natural resources while ensuring social and economic development

We consumed more natural resources in less than eight months than the world could produce in a year. This means that we live a considerable part of the year by using resources that will be lent to us by future generations.

Currently, there are more than 7.9 billion people on the earth. The rapid augmentation of this population has greatly accelerated the exploitation of the earth's natural resources. The reason for this is that as the population grows, so does the demand for resources and the circumstances needed to support life.

Negative effects of overusing our natural resources



Water Shortage

The main reasons for the depletion of water resources due to wasting, contamination, and damage of water catchment regions are deforestation, bad farming practices, and pollution. In fact, a billion people experience water scarcity as a result of deforestation and contaminated groundwater. Famine and increased food insecurity follow from that.

Forest Cover Loss

The world's natural forest cover is presently in jeopardy due to the annual loss of nearly 15 million acres of forest. Even worse, during the past three decades, deforestation has resulted in a 12–17% increase in greenhouse gas emissions. Loss of biodiversity, soil erosion, and drastic climate change are further catastrophic repercussions.

Depletion of oil

Oil, a non-renewable resource, provides around 40% of the energy consumed worldwide. Therefore, considering the high rate of exploitation, study indicates that the residual oil supplies might not survive for the next three decades. Due to its importance as a raw material in manufacturing, mining, agriculture, and transportation, its depletion would have disastrous impacts on a number of businesses.

Depletion of Minerals

The exploitation of these minerals has increased over the past ten years as a result of the fact that materials like gasoline, zinc, phosphorous, and others are crucial components in manufacturing processes. However, since minerals like phosphorus are crucial for plant growth, this has a number of detrimental repercussions on the environment.

Species Extinction

Some animal species are endangered due to habitat destruction and deforestation. This is due to the fact that forests are home to numerous creatures, many of which are threatened by deforestation and the overuse of forest resources. The number of marine species is also significantly decreased by other practices such as lake pollution and overfishing.

Solutions To Prevent Natural Resource Overexploitation

The prevention of deforestation

Governments are supporting movements and establishing laws by prohibiting the exploitation of forests as initiatives to reduce deforestation gain popularity around the world. Some programs also serve as incentives to persuade the public to take part in forest conservation in order to safeguard wildlife habitats and rare plant and animal species.

Reducing the amount of oil and other minerals consumed

Regulatory agencies for consumer goods and oil-producing nations should work together towards the global reduction of oil and mineral consumption.

Consumers can be made more aware of the benefits of reusing particular products to cut down on waste, manufacturers may also be taught on other methods of replacing some of the minerals.

Utilization of Renewable Energy Sources

Wind and solar energy are examples of renewable energy sources that can lessen our heavy reliance on fossil fuels. That will have a favorable effect on the environment because fossil fuels are a significant cause of environmental pollution, global warming, climate change, and the degradation of natural habitas.

Preserving the wetlands and coastal ecosystems

Groundwater is abundant in wetlands, which support plants. Due to the fact that they refill the food chain and provide the nutrients and minerals required for animal and plant diversification, coastal and wetland ecosystems are therefore essential to maintaining the food chain. Additionally, coastal ecosystems aid in defending marine life from overfishing.

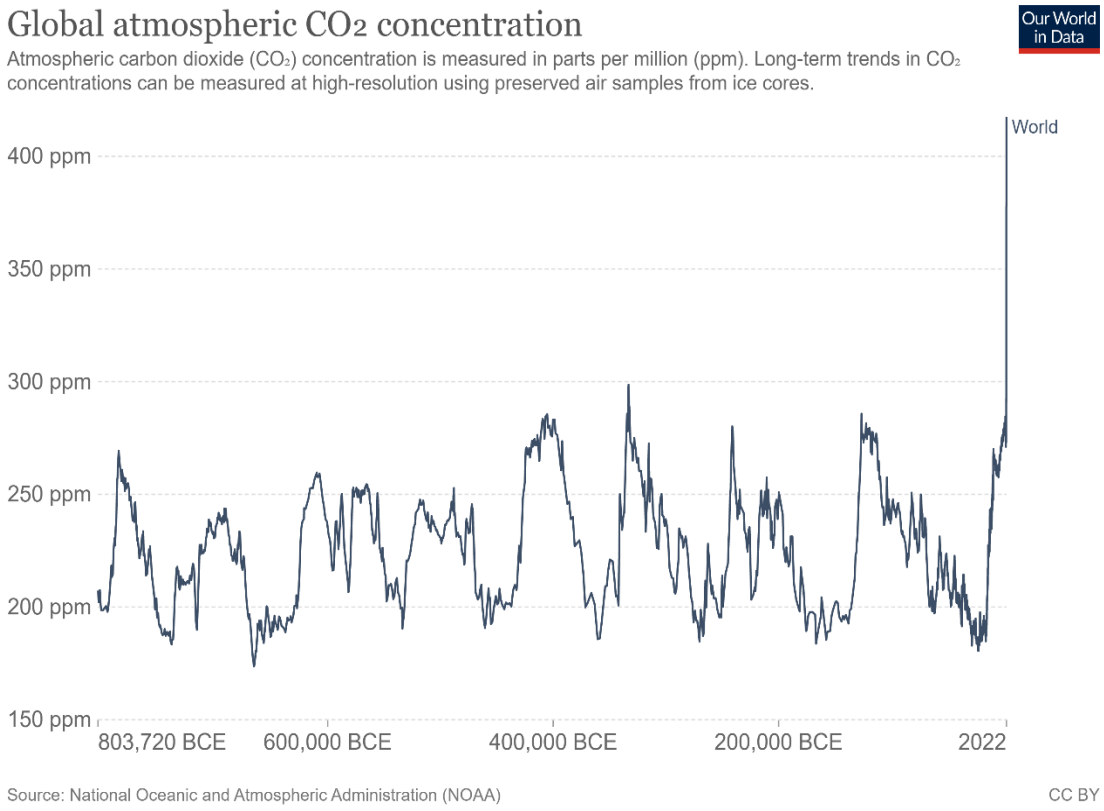
Carbon Dioxide and Carbon Footprint

Carbon Dioxide

At normal pressure and temperature, carbon dioxide is a colorless, non-flammable gas. Carbon dioxide has a significant role in the composition of our planet's air, while being far less prevalent than nitrogen and oxygen in the atmosphere. One carbon atom and two oxygen atoms make up the molecules of carbon dioxide (CO_2).

As a significant greenhouse gas, carbon dioxide aids in keeping heat in the atmosphere. Our earth would be uninhabitably cold without it. However, a rise in average global temperatures brought on by rising CO_2 levels in our atmosphere is affecting other facets of Earth's climate.

In dry air, carbon dioxide is the fourth most prevalent element. The atmosphere currently contains more than 400 ppm (parts per million) of it. The atmospheric concentration was close to 270 ppm prior to industrial activities. Thus, since the beginning of the Industrial Revolution, the amount of carbon dioxide in our atmosphere has increased by around 40%, which is increasing the earth's temperature.

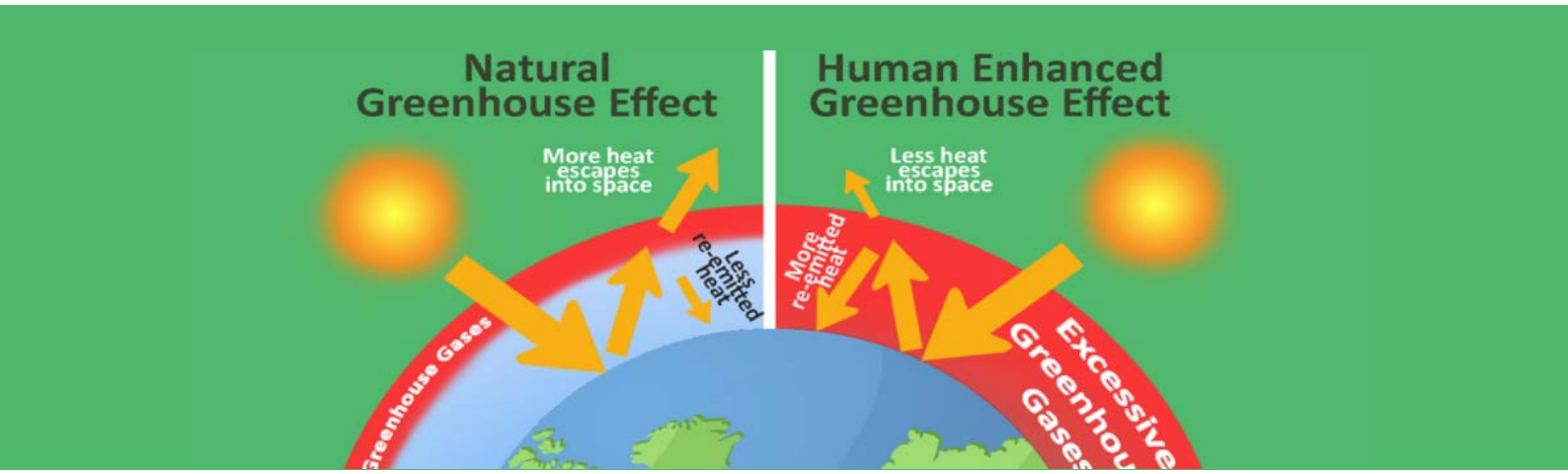


How is heat trapped by carbon dioxide?

You have undoubtedly previously heard that carbon dioxide and other greenhouse gases capture some of the heat that Earth could otherwise radiate into space, but how precisely can some molecules absorb heat? To get the solution, one must examine physics and chemistry in depth.

When sunlight hits the surface of the Earth, some of the light's energy is absorbed and then reradiated as infrared waves, which humans experience as

heat. You can experience this phenomena for yourself by placing your palm over a dark rock on a warm, sunny day. These infrared rays ascend into the atmosphere and, if undisturbed, will reenter space.



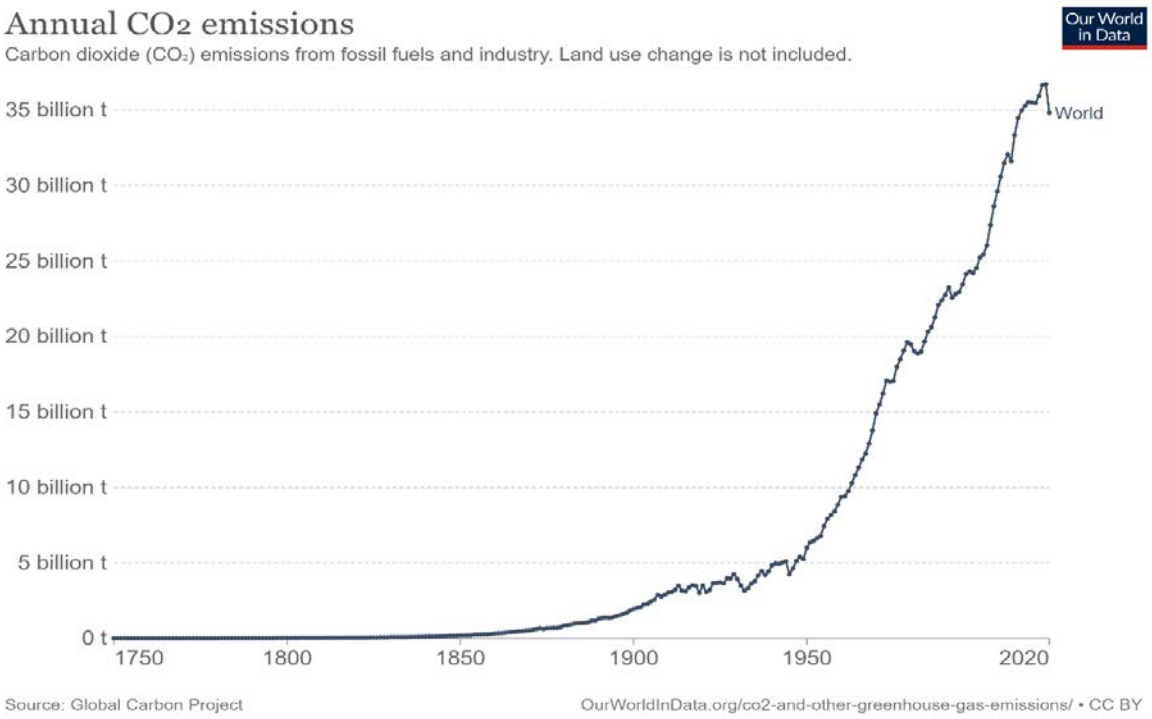
Because oxygen and nitrogen absorb energy with wavelengths that are close together, such as 200 nanometers or less, whereas infrared energy has larger wavelengths, such as 700 to 1,000,000 nanometers, oxygen and nitrogen do not interfere with infrared waves in the atmosphere. Because certain wavelength ranges don't overlap, oxygen and nitrogen act as if infrared waves don't even exist, allowing heat and waves to travel freely through the atmosphere.

It's different with CO_2 and other greenhouse gases. For instance, carbon dioxide absorbs light at a range of wavelengths between 2,000 and 15,000 nanometers, which overlaps with the infrared spectrum. When CO_2 vibrates, it reemits the infrared energy in all directions after absorbing it. The "greenhouse effect" is a result of around half of that energy leaving the planet and returning as heat.

How have carbon dioxide emissions changed throughout time at a global scale?

The graph below shows the increase in worldwide emissions from the middle of the 18th century to the present.

We can observe that emissions were very minimal before the Industrial Revolution. Emissions growth remained comparatively slow until the middle of the 20th century. The globe released 6 billion tonnes of CO2 in 1950. This amount nearly quadrupled by 1990, topping out at over 22 billion tonnes. We currently emit about 34 billion tonnes of carbon dioxide annually and emissions have continued to climb quickly.

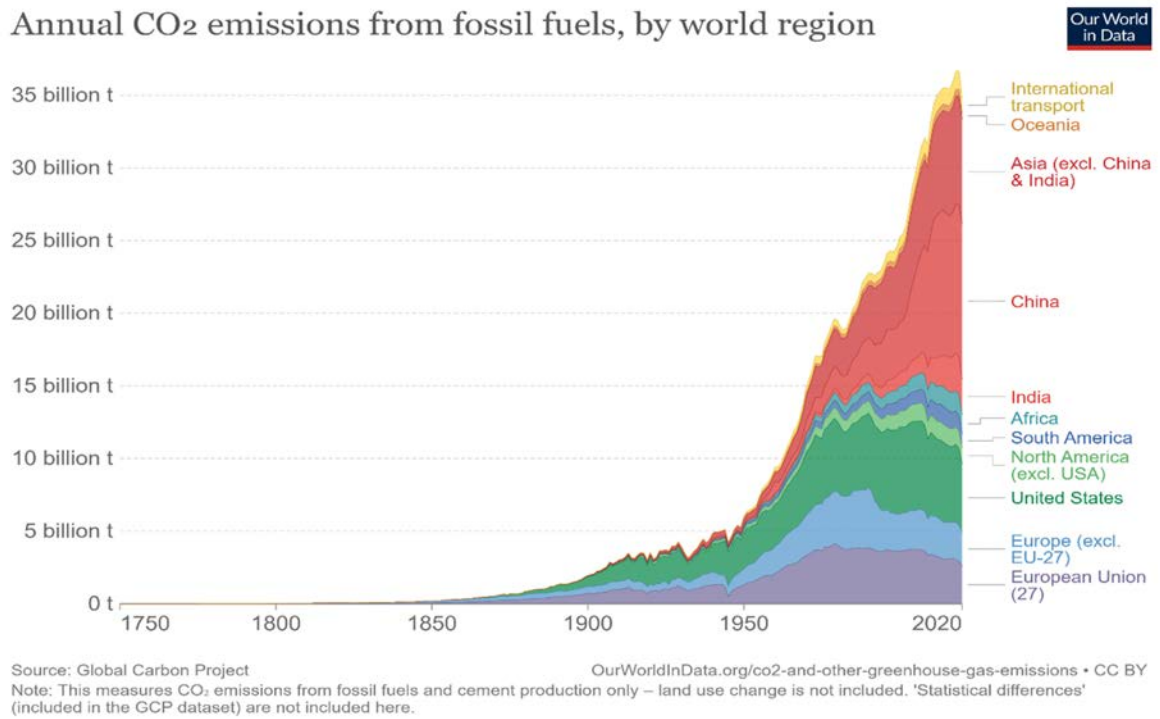


CO2 emissions

We can see that up until the middle of the 20th century, Europe and the US accounted for the majority of world emissions. Even by 1950, they were responsible for more than 85% of emissions annually. In 1900, more than 90% of emissions were produced in Europe or the US.

However, there has been a substantial change in recent decades. The rest of the globe, especially Asia and most notably China, had a large increase in emissions

in the second half of the 20th century. Currently, about one third of emissions are produced in the US and Europe.



Carbon Footprint

Regardless of lifestyle, every person leaves a carbon footprint on the world (energy consumption, activities carried out, etc). A person's total greenhouse gas emissions, both directly and indirectly, associated with supporting their lifestyle and activities are referred to as their "carbon footprint." A person, an organization, a product, or an event, among others, may have a carbon footprint that is quantified in equivalent tons of CO2 over the course of a year.

The creation and utilization of fossil fuels, food, manufactured items, materials, roads, and transportation can all contribute to the greenhouse gases that make up a person's carbon footprint. Despite their significance, carbon footprints are challenging to precisely assess due to a lack of information and incomplete data on the intricate interconnections between contributing systems, including the impact of natural processes that absorb or release carbon dioxide.

How to calculate the carbon footprint?

There are mainly 3 categories where the carbon footprint can be measured, by individual, by company and by product.

The Personal Carbon Footprint is a tool used to assess how an individual's actions affect the environment. Its calculation enables you to adjust your consumption patterns and minimize or optimize your energy efficiency to lessen your impact on the environment.

There are several things to consider when calculating your annual personal carbon footprint. Transportation includes both routine travels, like those made by car, bus, metro, train, or bicycle, and more unusual ones, such those made by airplane. The relationship between housing and energy depends on factors such as the type of habitation (home, apartment, etc.), its size, the number of occupants, the electrical appliances used, the energy generated, the type of heating utilized, and others. Additionally, there are consumption and lifestyle factors including diet, trash disposal, and composting.

To calculate an estimate of your carbon footprint visit, for example, the website:

www.footprintcalculator.org/

The effect of a firm's operations on the environment is referred to as the carbon footprint of a company or organization. A company's greenhouse gas emissions must be calculated while accounting for any direct or indirect effects brought on by the expansion of its economic activity.

More attempts are made every year in Europe to persuade businesses to take the lead on climate action and achieve carbon neutrality.

The total emissions produced during a product's or service's life cycle, from the extraction of the raw material to the point of consumption, are included in the carbon footprint of that good or service. The life cycle's many stages include raw material extraction and transportation, product development, distribution, usage, and end of useful life.

What steps can you take to reduce your carbon footprint?

In general, single-family homes use more energy per inhabitant than multifamily housing, particularly apartment complexes. However, there are things you can do to lower the amount of energy your home uses and so lessen your carbon impact, regardless of where you reside.

Compared to standard incandescent light bulbs, energy-efficient light bulbs like compact fluorescent and LED light bulbs use less electricity. You will also reduce your household energy costs by switching to LED's for your lighting fixtures.
A programmable thermostat automatically adjusts the temperature in your home according to the time of day. Your carbon footprint decreases when your home's energy system is operating well because it wastes less energy.

Appliances that are energy-efficient utilize less energy. Look for the energy efficiency label when buying new equipment like a refrigerator, range cooker, microwave, or air conditioner to reduce your carbon footprint and save energy, money, and the environment.

Almost every kind of transportation uses energy, which affects your carbon footprint. Carbon dioxide is emitted by all gasoline-powered cars, and the bigger and heavier the car, the more carbon dioxide is emitted. Cars that receive regular maintenance use less energy. Make sure the tires are constantly correctly inflated and that the air filter is changed on a regular basis.

Energy is needed from farms, factories, vehicles, grocery shops, and more for the production, processing, packing, transportation, and distribution of food. A vegetarian's carbon footprint is often smaller than a non-vegetarian's because a vegetarian diet excludes meat. If you typically eat organic food, you have a reduced carbon footprint because producing organic food is less stressful on the environment.

Even pure water that enters our drains and sewers must be treated at water treatment facilities. Your carbon footprint can be decreased by simply using the water you actually need.

Recycling protects the environment by preventing garbage from entering landfills and trash incinerators. Your carbon footprint is lower if you recycle frequently.

Composting benefits the environment by preventing food and yard waste from entering landfills and by promoting organic gardening techniques. Your carbon footprint is reduced if you compost at home.

Pollution with Household Waste

Household waste is typically called to as garbage or trash. The amount of waste created increases together with the global population. In general, waste production increases as human cultures grow more automated and industrialized.

For instance, the industrial revolution brought about new produced goods and new manufacturing techniques, which increased the amount of industrial garbage and home solid waste. The excessive packaging of many products and modern consumerism both considerably contribute to the rise of solid waste.

One of the most significant parts of municipal garbage is household waste. Food scraps, paper, glass, metals, plastics, textiles, and other household trash are among them.

Plant and animal waste, which are classified as wet wastes and include vegetables, fruit peel, bone and meat scraps, poultry and fish scraps, makes up a sizable portion of household garbage. Another significant component of the wastes includes paper and cardboard, used books and notebooks, old newspapers, and wrapping paper. Other household waste includes plastics, disposable items like plates and cups, toys, and metal and glass cans.

In less industrialized times, as well as today in many developing nations, homes and businesses discharged waste in waterways or on land. However, this procedure has unfavorable side effects such as noxious odors and health risks. Rats and other pests that spread disease, like insects, thrive in open landfills. Waste disposal techniques were investigated and improved as the first world became more aware of environmental risks. However, governments, legislators, and individuals still struggle with the issue of how to enhance garbage disposal, storage, and recycling techniques today.

Types of waste

Understanding the many forms of waste will influence how you dispose of it. That information is crucial and people need more information about the various sorts of waste in order to make the best decisions possible about how to dispose of it.

Medical Waste

When treating or diagnosing people or animals, medical or clinical waste is produced. Additionally, waste of this kind is produced when biological materials are produced or tested for research purposes. Even if it is not deemed dangerous, medical waste, which is typically produced by health care facilities, hospitals, veterinarian offices, clinics, etc., should be appropriately disposed of.

Electrical Waste

Electrical waste, often known as E-waste, includes computers, printers, computer components, music players, telephones, TVs, vacuum cleaners, and others. It essentially incorporates all furniture, appliances, and commercial equipment that has electronic components and a power source or battery. These

products may include harmful substances for both persons and the environment, such as antimony oxide, brominated flame retardants, mercury, cadmium, and lead.

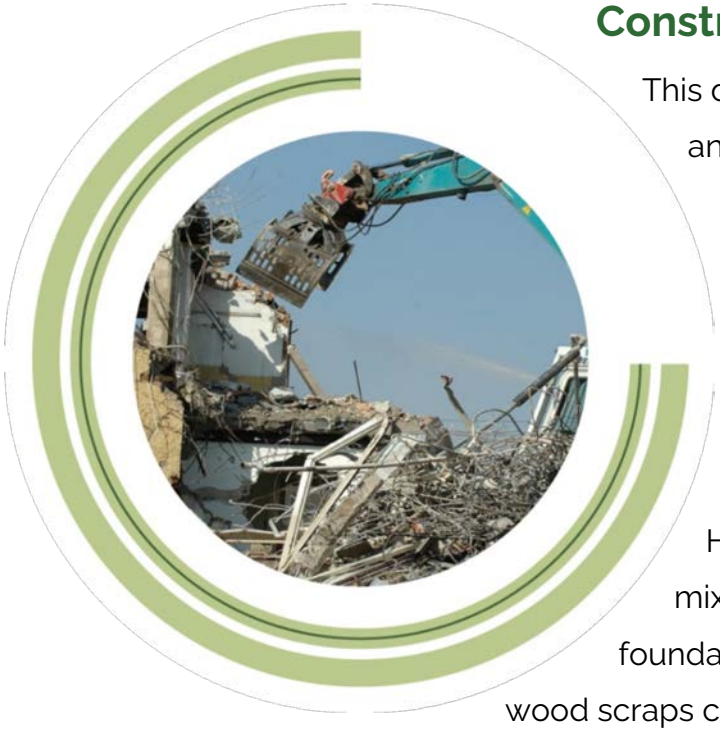
Recyclable Waste

These are the waste resources that can be transformed into reusable items. This waste, which is typically found in home trash, also contains food and drink containers, cardboard, glass, paper, and metal. The best way to ensure that these objects fit into your recycling container is to compress them down.

Hazardous Waste

Government regulations typically apply to this type of waste, which includes hazardous medications, pesticides, weed killers, mercury, certain paints, flammable liquids, aerosol cans, fluorescent light bulbs, solvents, household chemicals & cleansers, and so on. Because chemicals can be reactive, corrosive, inflammable, or explosive, it is unsafe and dangerous to people to dispose of hazardous materials in your recycling container. Hazardous garbage that has been improperly or illegally disposed of can contain dangerous substances that can contaminate our air, water, and food. For instance, just 1 litre of oil can render almost 1 million litres of freshwater unfit for human consumption.

Construction Waste



This debris is typically produced during building and renovation operations and is large and heavy. It might contain trash like carpet, concrete, fill soil, roofing shingles, asphalt, bricks, plumbing fixtures, ceiling tiles, and bricks. Bricks and cement blocks among other building and demolition waste can be salvaged and put to other uses. However, they are typically crushed and mixed with concrete and asphalt to create the foundation for driveways and roadbeds. Untreated wood scraps can be recycled into dimensional lumber, however they are often chipped for use in landscaping and composting.

Green Waste

This kind of waste is made up of food waste and landscaping debris that naturally decomposes in a short amount of time under the right pressure and temperature conditions. Grass, tree limbs and branches, weed clippings, trash from vegetables, bread and grains, and paper materials are all examples of green waste.

Types of Household Waste

There are various sorts of household waste and all these types of waste should be properly divided because some could be recycled. By not doing this all the waste will undoubtedly wind up in a landfill, which is not helpful for the environment in the least.

For a better understanding of how to dispose of your waste more effectively, here are listed down some common categories of home waste:

Liquid Waste

Wastewater, fats, oils, or grease, used motor oil, liquids or sludges are examples of liquids that fall under the category of liquid waste. Hazardous home liquids such as cleaning fluids, some detergents and pesticides also fall under this category. These fluids are dangerous or could be damaging to the environment or human health and they should not be thrown down the drain.

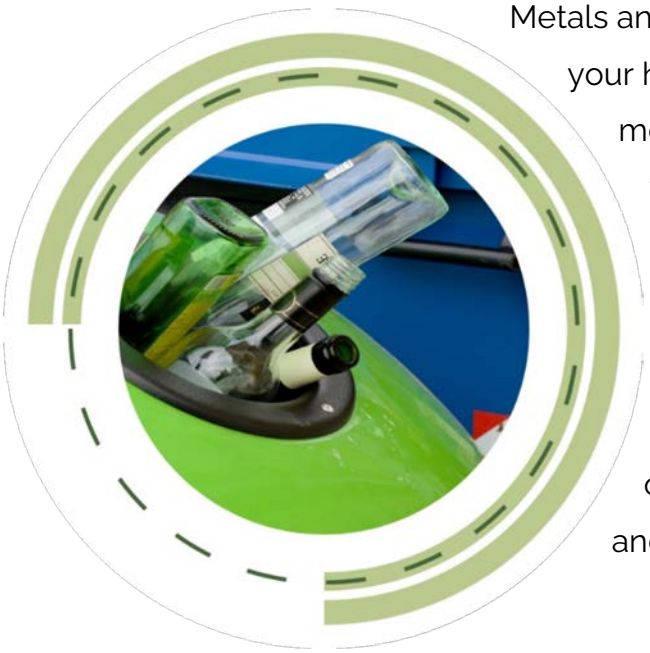
Be aware of your local opportunities to properly dispose these items as it changes from city to city and country to country.

Solid Waste

Various items that you could find in your home as well as in business and industrial settings are considered solid waste. Four categories are typically used to categorize solid waste.

Plastic waste includes bottles, bags, jars, and other household items made of plastic. Despite the fact that plastic cannot biodegrade, many of its varieties can be recycled. Plastic waste needs to be sorted from other trash before being disposed of in the recycling container.

Paper waste includes newspapers, cardboards, packaging materials, and other products. It is simple to recycle and reuse this kind of material. As a result, be sure to place them in your recycling bin or transport them to a nearby recycling facility.



Metals and tins are waste that can be found all over your home in a variety of different forms. Most metals may be recycled with ease. Therefore, to properly dispose of this waste, take these things to your neighborhood recycling facility or place them in your recycling bin.

Glass and ceramics are materials that may be recycled with ease. To properly dispose of these waste products, look for bottle banks and glass recycling boxes in your neighborhood.

Organic Waste

This is another typical home waste. It comprises food scraps, garden waste, and any other biodegradable material derived from plants or animals. Microorganisms gradually transform organic waste into an organic fertilizer. This does mean that you should not just throw them away wherever, either. Dispose of organic waste with regular trash results in the creation of methane in landfills. To dispose of organic waste there are proper bins for that purpose. For proper disposal of this material, you may also get in touch with the local opportunities to do so.

Waste management

With the goal of minimizing waste disposal and promoting resource efficiency and conservation, there is a recommended waste management hierarchy.

The environmental, economic, and energy implications of waste management operations are ranked in this hierarchy.

From most prefered to least prefered the order is the following:

1 - AT SOURCE REDUCTION AND REUSE	REDUCING WASTE AND USING ITEMS SUSTAINABLY OR MORE THAN ONCE (FOR EXAMPLE, BY REUSING CARRY BAGS OR PACKAGING JARS)
2 - RECYCLING	Recycling non-biodegradable waste to recover items of commercial value, such as plastic, paper, metal, glass, and e-waste
3- COMPOSTING	Compost is produced by decomposing organic waste
4- WASTE TO ENERGY	Energy recovery prior to final waste disposal, for example, incineration.
5- LANDFILLS	Sanitary landfills for the secure disposal of inert residual waste

At source reduction and reuse

Preventing waste formation at multiple phases, such as during the design, manufacture, packing, usage, and reuse of items, is the recommended choice for waste management in the hierarchy. Preventing waste also helps to lessen its effects on the environment, including leachate, air emissions, and the production of greenhouse gases. The most popular waste prevention tactics are reducing waste production at the point of origin and reusing things.

Recycling and Composting

Recycling waste to recover material resources through segregation, collecting, and re-processing to create new goods is the next preferable choice for waste management in the hierarchy. Composting is regarded as an organic material recovery technique and is frequently ranked at the same level as inorganic waste recycling in the waste management hierarchy.

Waste to energy

Energy recovery from waste through the creation of heat, electricity, or fuel is preferred when material recovery from waste is not an option. Some waste-to-energy processes include biomethanation, waste incineration, the creation of refuse-derived fuel, among others.

Waste disposal

At the bottom of the hierarchy, residual inert wastes must be disposed of in sanitary lined landfills that are built in compliance with local regulations.

Landfills that incorporate the capture and use of methane are favoured above those that do not. The least desirable alternative, according to the hierarchy, is to dispose of waste in open dumpsites.

The hierarchy suggests that before selecting and implementing suitable treatment technologies, all source waste minimization strategies should be used. This way it is possible to achieve the best waste management possible.

The Effects of Municipal Pollution

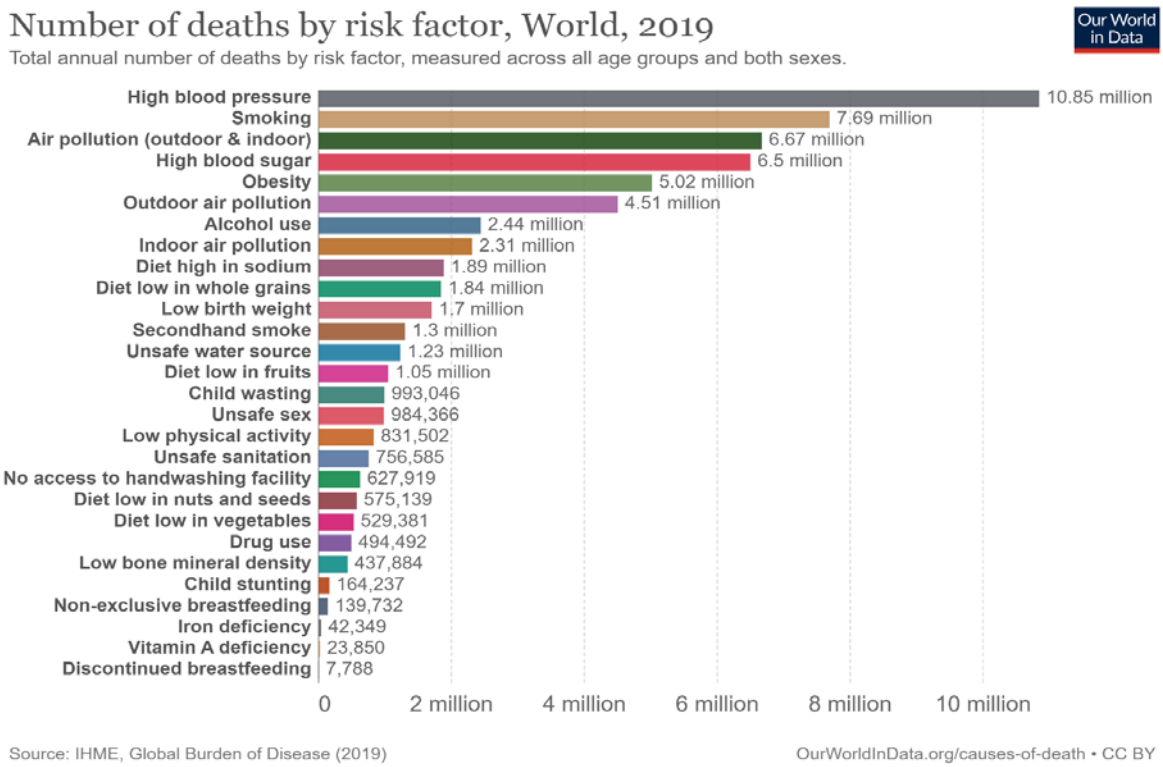
Urban air and water pollution

Cleanliness and environmental sustainability are two issues that cities all over the world struggle with. These issues include increased greenhouse gas emissions, unhygienic public areas, bad odors, rising energy use, low recycling rates, and constrained space.

One of the biggest issues with regard to health and the environment nowadays is outdoor air pollution.

Emissions from motor vehicle combustion, solid fuel combustion, and industry are the main contributors of outdoor air pollution. Other causes of pollution include wind-borne dust, vegetation-related biogenic emissions, and smoke from bushfires (pollen and mould spores).

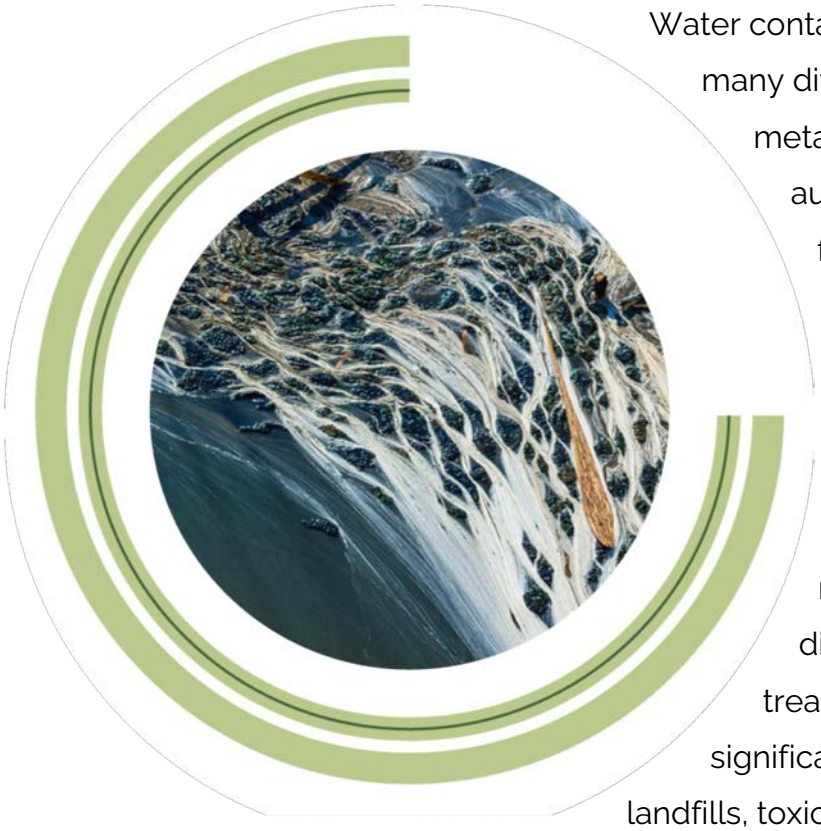
A number of the top causes of death in the globe, such as heart disease, lung cancer, and respiratory conditions like asthma, are at risk due to outdoor air pollution. [6] We can see from the graph that it is one of the major causes of death worldwide.



One of the main risks for death is air pollution. But its effects go even deeper because it is a significant factor in the burden of disease worldwide.

Air pollution has a significant impact on people's quality of life while they are still alive in addition to taking years off of their lives. Environmental effects are concentrated in smaller areas, including waterways, because everyone shares the same relative air and water space.

Large volumes of pollution from numerous sources enter urban rivers. This comprises waste, polluted stormwater runoff from urban landscapes, mobile sources (such as cars and trucks), residential and commercial wastewater, and industrial discharges. Urban populations frequently share centralized water sources, therefore this pollution causes environmental and public health risks like decreased drinking water quality and unsafe water bodies for swimming.



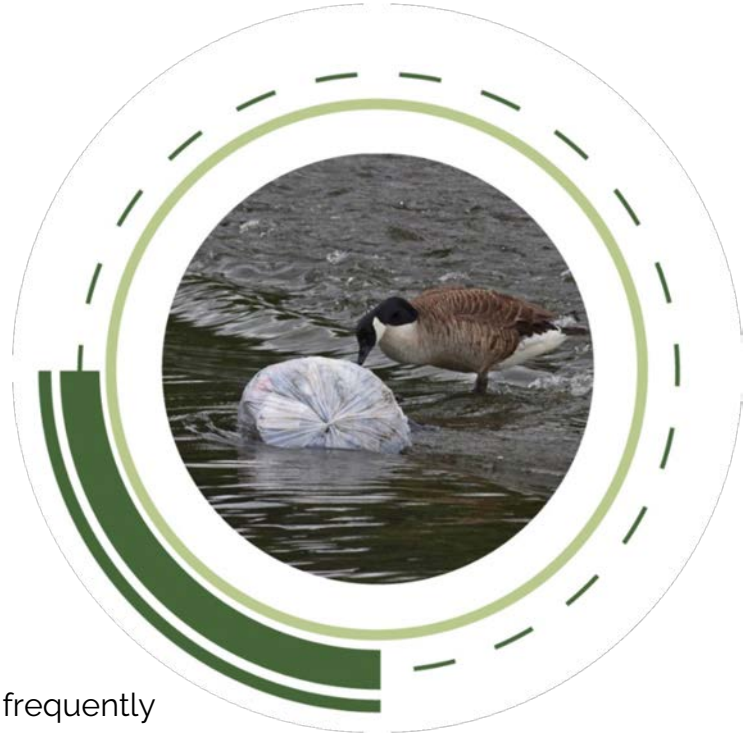
Water contamination in urban areas could take many different forms. Oil, rubber, heavy metals, and other toxins from automobiles are carried by runoff from streets. Sewage that hasn't been properly or adequately treated can contain significant levels of contaminants such fecal coliform bacteria, nitrates, phosphate, chemicals, and other microbes while being low in dissolved oxygen. Nitrate levels in treated sewage might still be significant. Numerous places, including landfills, toxic waste and chemical storage and usage locations, leaking fuel storage tanks, and the purposeful disposal

of hazardous materials, can contaminate groundwater and surface water. Acid rain, nitrate deposition, and ammonium deposition are all effects of air pollution that can change the chemistry of lake water.

Sustainable solutions must be found for the metropolitan area to reduce its reliance on pollutants and the amount of pollutants it creates, as well as to properly recycle or dispose of pollutants before they damage soil, water, or the atmosphere.

Urban pollution prevention is frequently mostly a public relations endeavor. People must be informed about how to properly dispose of waste. The best way to convey the information is by demonstrating to one another where waste lands and the issues it can cause in our watersheds.

Wildlife and the urban toxicity



Pesticides, industrial pollutants, and heavy metals are examples of toxins that are artificially introduced into the environment by human activity, such as as a consequence of mining and farming.

We might understand why urban wildlife would have higher toxicant loads because urban regions are known to have higher pollution levels than rural ones. This is so because traffic and industrial activities are frequently linked to pollution.

Compared to its counterparts in the countryside, wildlife living in cities or suburbs faces distinct health concerns that are frequently brought on by human activity. Overall, we discovered that urban wildlife was in worse health than species in

more natural settings. This was mostly driven by urban animals' tissues containing more toxins. [7]

Waste management Infrastructure development

To address this issue, civil infrastructure needs to be improved in urban areas. Effective economic growth requires the creation of high-quality infrastructure that caters to the demands of the population while safeguarding the environment. Infrastructure for waste management is crucial for achieving sustainable development. Natural resource depletion is a result of urban regions' rapid population increase.

Effective waste management with resource extraction is essential to effective waste management because urban wastes are potential resources. Value can be extracted from trash in the form of materials, energy, or nutrients, which can support the livelihoods of numerous people.

Only by investing in waste management facilities can wastes be converted into resources, which depend on a coordinated set of measures to generate markets and maximize recovery of reusable/recyclable materials. Future waste management infrastructure development in all urban areas must focus on materials, energy, and nutrient recovery because resources may be extracted from waste utilizing current technologies.

A City Without Waste

Cities draw people because of the social, economic, and quality of life opportunities they provide for their residents.

Cities are overconsumptive, and high consumption cities generate more garbage per person than low consumption cities. A 100 percent recycling rate and the recovery of all resources from waste materials are part of the idea of the city without waste.

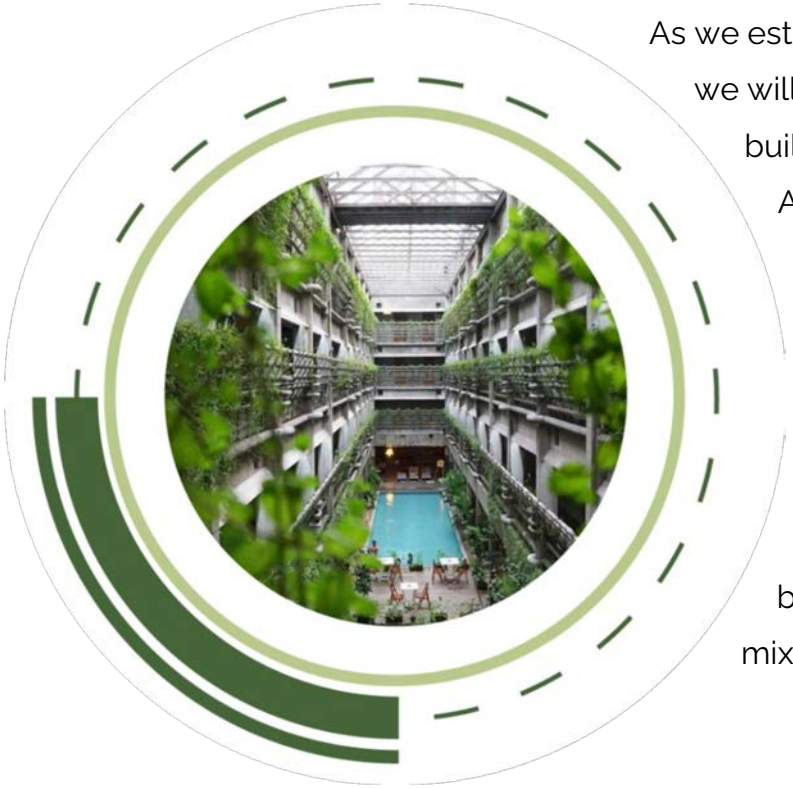
More waste is produced globally than any other environmental contaminant, thus addressing this issue can have a far quicker and more significant impact on the fight against climate change. For instance, the tonnes of food waste dumped in landfills each year degrade into methane, a gas that is 25% more potent than CO2 and contributes to current global warming. [8] World solid waste and material management system transformation might significantly cut global emissions.

Municipalities in urban areas around the world are hastening the transition to a future in which there is no waste. In order to make our cities' urban centers cleaner, healthier, more resilient, and inclusive, municipalities have pledged to take bold, quantifiable, and inclusive initiatives to reduce municipal solid waste creation and enhance materials management in their cities. For social entrepreneurs and vulnerable areas, improved waste management can also generate employment and economic prospects.

The city without waste strategy is an ongoing endeavor to eliminate waste by developing systems that do not produce waste in the first place rather than burning or landfilling it.

The future of a city without waste

There will be many changes in several areas to achieve the objective of a city without waste. Urban farming will reintroduce food production into urban areas, building efficiency will increase, and public transportation will take precedence over private automobiles in the future. Private vehicles will be viewed as a waste of space in cities, and public spaces will be improved to make cycling and walking more enjoyable and secure. Most cities need to make considerable improvements to their public spaces in order to enhance urban waterfronts and the space between buildings and provide improved chances for social interaction among people of all ages.

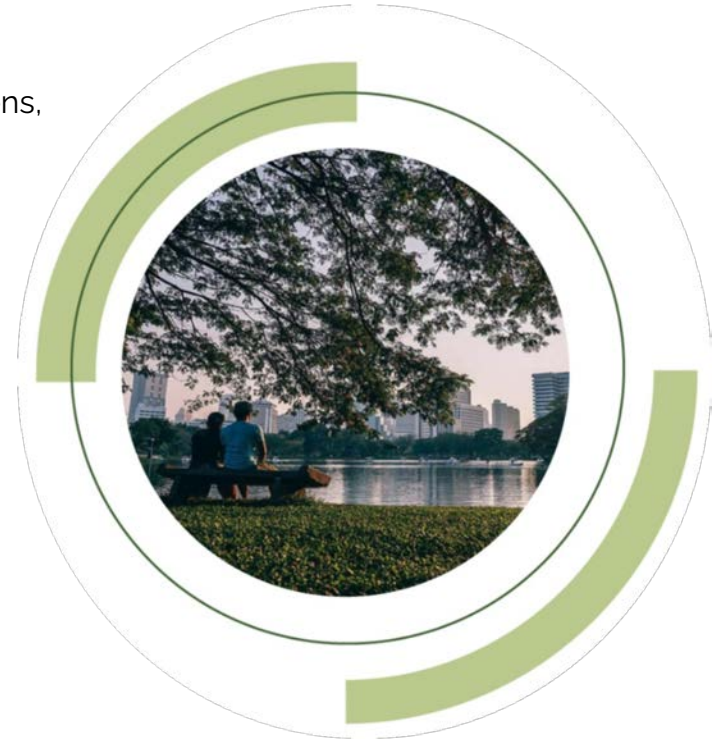


As we establish new communities in the future, we will also be retrofitting the infrastructure, building materials, and current ones. Architecture and design will focus more on resource-efficient retrofitting, urban redevelopment, and adaptive reuse of existing buildings and neighborhoods rather than creating brand-new structures. Old commercial centers are already being transformed into high-density, mixed-use projects.

The goal is to create environmentally friendly designs that are inspired by nature, where waste is viewed as a resource and organic waste is used as fertilizer, where new construction materials are made from recycled materials, and where the potential for renewable energy is fully realized by utilizing biomass, wind, solar and biomass resources to nourish renewable energy into a smart grid. We will alter the way we produce energy and observe an increase in decentralized systems on rooftops and facades, where cities transform into power plants, and where all residents can produce energy rather than just consuming it.

The way society handles waste has already undergone significant change, and both waste production and recycling rates have been steadily rising. But for the recycling economy of the twenty-first century to become a reality, awareness-raising and behavior-changing programs are required. In the same way that legislation is required to force product manufacturers and construction firms to operate in a more resource-efficient and waste-free manner, consumers need to be made aware of the value of waste, such as the value of food waste, e-waste, glass, and packaging cardboard.

We must acknowledge that, as world citizens, we inhabit a planet with limited resources. Therefore, for the planet to remain sustainable, efficient resource use and resource recovery from waste are essential. A city can be really sustainable if it can produce its own food, use water from its own sources, generate its own energy, create jobs and other economic activity, govern the system effectively, and finally recover all of its resources from waste streams



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A. PRACTICAL LEARNING ACTIVITIES
(realized by SEP)

Introduction

*The training workshop related to **The impact of daily activities on the environment** chapter was designed to take place during a session of at least 3 hours. Parents/grandparents accompanied by children/grandchildren will participate in the activities. The association of parents/grandparents - children/grandchildren has the role of creating a bridge between generations to achieve a common goal: a friendlier attitude of families towards the environment. The training activities will focus on the triad:*

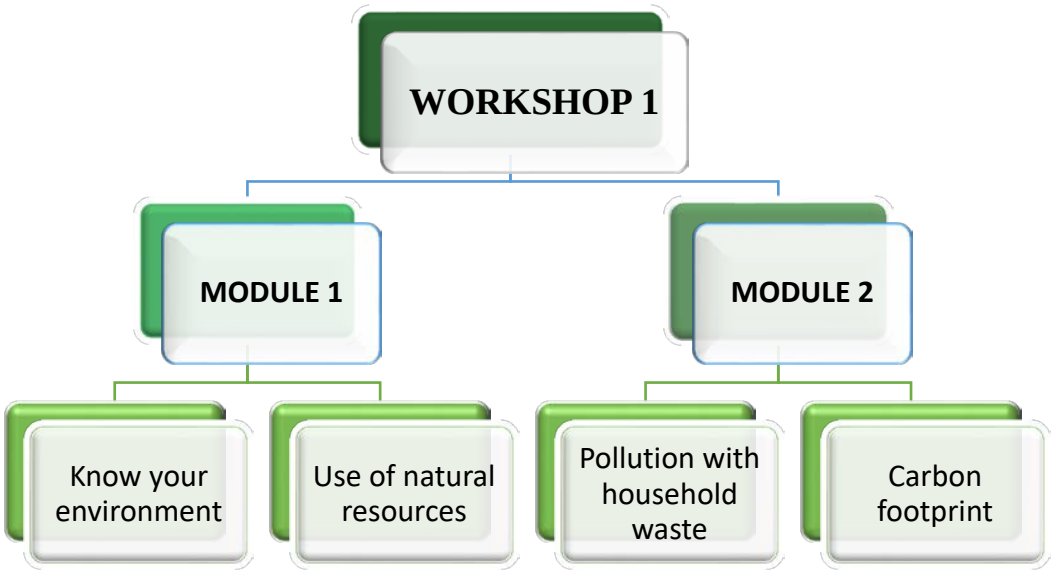
AWARENESS-MOTIVATION-INVOLVEMENT

The space where the face to face activities will take place will be organized to allow teamwork and will be provided with a video projector.

The training activities were organized in 2 modules separated by a 10-minutes break. The activities where adults/children will work as a team as well as the activities where members of a family will collaborate have been selected.

*MODULE 1 was structured in 2 sequences lasting 85 minutes: **Know your environment** and **Use of natural resources**.*

*MODULE 2 was structured in 2 sequences lasting 85 minutes: **Pollution with household waste** and **Carbon footprint.***



MODULE I

Module preparation

• Arrange the room so that the participants can work in teams of 2-5 members;

• Print and copy documents for each participant/use digital version of those documents

Sequence 1. Know your environment

"It is our collective and individual responsibility to preserve and tend to the world in which we all live".

Dalai Lama

Context

The terrestrial environment is always changing, both within natural cycles and as a result of certain events or influences, including human activity. To help the participants understand environmental changes at a global scale, this sequence aims to get them to first understand how the components of the environment interrelate at a smaller scale.

Activity

Prepare a list of environmental changes that have resulted from human activity in the local area. Focus on changes that are visible and/or measurable.

For instance, the participants could analyze the way in which the introduction of an anthropogenic structure (a dam, a factory, a neighborhood, etc.) into a particular natural environment has affected that environment.

- Explain those attending the workshop that this session will look over the connections that can exist in a particular environment and how changes in this environment can affect these connections. Begin by asking the participants to think of a familiar local environment (this could be their home town or a larger region). They will work in teams and they will analyze the components of the environment: landform, water, air, soil, plants, animals, people and anthropogenic components.
- For efficiency, it is recommended to use a worksheet that will be sent to each team.
- Ask the participants to identify at least 2 connections they have noticed in their environment. Each team must choose two items that are connected from their list of observations and describe that connection on a poster.

Example of connection

Write "squirrel" on the right side of the paper and "tree" on the left, then draw a line between them. On the line, write "the squirrel uses the tree for shelter and food."

They can draw a diagram or other picture to help explain the connection. When everyone has completed the task, ask the groups to display the posters on the boards. Then ask all groups to walk around to see the connections everyone has found.

- Select one of the connections described by the participants and challenge them to reflect on the effects of removing one of the connected elements.

➢ **How would this affect the other element in the connection?**

➢ **What would happen to the rest of the environmental elements?**

| Worksheet |

1. The landform

……

……

2. What are the local climate characteristics? (seasons, precipitation distribution, etc.)

……

……

3. What are the water resources of the area?

……

……

……

4. Identify 3 species of plants and animals that live in the local environment?

• Plants: ……

•Animals: ……

5. Soils in the local/area environment (appreciate their fertility, local particularities)

……

……

……

6. The anthropogenic component (constructions, human activities specific to the area)

……

……

……

7. What role do people play in this environment?

.....

.....

.....

Check the understanding

Ask the participants to work together with their children on a final project. Assign to each parent one of the local environmental changes brought about by human activity that you have already identified. It is the responsibility of family members to lead their own research regarding this environmental change and its implications for the future. Each family will repeat the process they used during the workshop. They may begin by observing and describing the environment and then identify the connections that exist within this environment. Then they should extend their research in order to analyze the change of this environment brought about by human activity but also to determine what effect (positive or negative) the activity has on plants, animals and physical elements. You can suggest the participants to consult different sources: Internet, press, etc.

The project will be uploaded to Blog and it will include an explanation of the environmental changes they have noticed, what these changes imply for the future and if it's relevant, some recommendations on what should be done about these changes. If it is not possible for the family to analyze an environmental change related to human activity in their local community, suggest another region for their research.

Sequence 2. Use of natural resources

Context

Unsustainable consumption and production practices not only deplete natural resources through the use of material inputs, but also cause environmental impacts as a result of the extraction, processing, manufacturing, consumption and disposal of waste at every stage of a product or service's life.

These impacts of unsustainable consumption and production on the environment are causing the three planetary crises we are currently facing:

- ***climate changes;***
- ***loss of biodiversity;***
- ***pollution.***

They are deeply interconnected and influence each other: pollution contributes to climate change, and biodiversity loss is exacerbated by both climate change and pollution.

The unsustainable consumption of natural resources also has a negative socio-economic impact on communities and individuals. For instance, depletion of soil resources or its degradation as a result of unsustainable agricultural practices affects farmers' livelihoods, which leads to food and economic insecurity. The loss of availability of natural resources and the livelihoods of those who depend on them is also a major cause of conflicts and wars.

The socio-economic impact caused by unsustainable consumption and production is felt unevenly around the world. The poorest people are those whose survival depends directly on natural resources and who have the least means of support to cope with the consequences.

When we shop we rarely think about the chain of activities, the operations that made the item what it is. A product is obtained from NATURAL RESOURCES that are limited and has undergone a series of complex processes before reaching the consumer.

To better understand the connection between the economy and the environment we must become aware of the life cycle of the products we buy. This cycle includes the resources and processes involved in manufacturing a product, delivering it to market, and disposing of the product after use.

As customers, we must become aware that our decisions concerning the goods and services we buy determine the allocation of resources. A business can only survive if it meets the demands of consumers, that is, ours. However, we underestimate our role as consumers. Smart consumers can positively influence the quality of life and the environment. This awareness can lead to a change in consumer habits that will be reflected in a sustainable economy.

ACTIVITY 1

Identifying the resources used in the production of different goods

This activity helps the participants better understand how and what resources, labor and capital are used to produce goods. With this knowledge, they will better appreciate the concept of consumer sovereignty, or the power they have as consumers to make a change or a difference.

Type of activity: individual/family analysis

1. Display different objects and explain that they are all obtained from natural resources (exhaustible, renewable, inexhaustible).

2. Invite the participants to complete the worksheet identifying the resources used to make the objects.

| Worksheet |

First item(food)

- *What renewable resources were used?*

.....

.....

- *What exhaustible resources were used?*

.....

.....

- *What will you do with the part of the product that you didn't use?*

.....

.....

Second item (long-lasting product)

- *What renewable resources were used?*

.....

.....

- *What exhaustible resources were used?*

.....

.....

- *What to do when the item is sold out?*

.....

.....

Third item (paper)

- *What renewable resources were used?*

.....

.....

- *What exhaustible resources were used?*

.....

.....

- *What to do when the item is used?*

.....

.....

Feedback

• For which item were the resources from which it was made easily identifiable?

• Why *was it difficult to identify for some items the resources from which they were made?*

Recommendation for the trainer

If they have failed to identify water as a resource used in all industrial processes, draw their attention to this. If they failed to identify electricity, explain that it is used in processing resources and it is obtained using different energy resources.

Group task

Roundtable activity

Identification at local or regional level of an unsustainably exploited resource that has produced or may produce in the near future a negative impact on the local community or on the individuals.

| Worksheet for children/youngsters (online) |

They will give 3/5 answers for each question according to age.

*Things that are made and/or used from plants:

……

……

*Things that are made and/or used from animals:

……

……

*Things that are made and/or used from fossil fuels:

……

……

……

*Things that are made and/or used from minerals:

……

……

……

*Things that are made and/or used from water, air or sun:

……

……

……

ACTIVITY 2

Food waste

Context

In 2022, humanity has consumed until July 28 all that the Earth can produce without exhausting its resources. For the remaining 156 days, the consumption of renewable resources was done by exhausting the planet's natural capital. At this rate of consumption, 1.75 planet Earths are needed to cover the needs of the population in a sustainable manner. It must be taken into account that the needs of the other species living on Earth were not included here.

This ecological footprint is calculated based on six different categories of resources:

- agricultural crops

- the pastures

- forest spaces necessary for exploitation

- fishing areas

- built spaces

- the forest spaces needed to absorb the carbon emitted by burning fossil fuels

In the last 50 years the gap has grown continuously: December 29 in 1970, November 4 in 1980, October 11 in 1990, September 23 in 2000 and August 7 in 2010.

The global food system is mainly responsible for this overconsumption. More than half of the planet's biocapacity (55%) is used to feed humanity.

Food production mobilizes all categories of footprints, especially crops (required for human and animal nutrition) and carbon (agriculture is a large emitter of greenhouse gases).

Agriculture contributes to deforestation, climate change by emitting greenhouse gases, biodiversity loss and ecosystem degradation, using a significant part of the Earth's freshwater resource.

The food system is closely linked to consumption habits, especially those in rich countries. For example, if all people on Earth lived like the French, the day of "exceeding" renewable resources would have been recorded on May 5, 2022.

"Limitarea risipei alimentare ne-ar permite să amânăm această dată cu 13 zile, iar acest lucru nu este deloc neglijabil"

Laetitia Mailhes

Food security is about the availability, the access and the use of food. When people have always access to enough nutritious food to maintain an active and healthy life, they are considered to enjoy the benefits of food safety. The limit below which a person is considered undernourished is 1800 calories per day. The number of people affected by malnutrition exceeds 800 million. Where can these people be found? The answer would be in developing countries.

But unfortunately there is considerable worldwide food waste that could be avoided and could feed the people suffering from hunger.

About a third of the food produced in the world for human consumption annually (1.3 billion tons) is lost or wasted. This is why it is necessary to change our consumption behavior,

The aesthetic standards that supermarkets have are generated by us, the consumers. If we don't buy a carrot because it's bent or an apple because it's a little bruised, they end up in the trash.

but to change it to such an extent that we can also influence the patterns of supermarkets.

The highest waste rates are among:

- roots: between 40-50%

- fruits and vegetables: 30%

- cereals: 30%

- fish: 30%

- oilseeds: 20%

- meat and dairy products: 20%

Food loss and waste are actually a major waste of other resources: water, land, energy, labor and capital, and they unnecessarily produce greenhouse gas emissions, contributing to global warming and climate change.

Did you know that...

Food wasted in Europe could feed 200 million people. In the US, more than $30 billion worth of food is thrown away annually. The food currently lost or wasted in Latin America could feed 300 million people.

Inefficient processing and drying, poor storage and inadequate infrastructure are the driving factors for food waste in Africa. In sub-Saharan Africa, post-harvest food losses are estimated at 4 billion US dollars per year – enough to feed at least 48 million people.

Causes of food waste

Food waste can occur in all the steps of the food supply chain, namely at the farm, at processing and manufacturing, at marketing, in restaurants and canteens, as well as in the households of the population. The reasons for the production of food waste vary widely and are specific to each field of activity.

Did you know that...

55% of food waste comes from households?

Factors contributing to food waste in households

- Not planning/improper planning of food shopping;
- Promotional offers such as "buy one get one free" lead to the purchase of an amount of food that is often not justified;
- Misunderstandings about the meaning of "expire on" and "best before", labels with information leading to increased amounts of wasted food;
- Producing too much food in the household. This phenomenon is specific to Romanians during holidays or various events;
- Refusal to buy fruit and vegetables that have small aesthetic imperfections;
- Inadequate food storage;
- Too large portions of food at the table.

Individul task

Identify 2 habits that make you a food waster.

How can we reduce food waste?

Everyone has an important role to play in reducing food waste! Often with minimal effort, food waste can be reduced, saving money and helping to protect the environment. It's much easier than you think! **Here's how:**

At home

- Plan your meals;
- Use the extra food or the leftovers from the preparation of previous meals;
- Read correctly the information about food perishability. 'expiration date…' informs us about the safety of the food and ' best before' and 'better if used by/before…' informs us about the quality and the freshness of the food;
- Put less on the plate and refill if necessary;
- Freeze ready-made meals;
- Store food properly (check labels for storage instructions, make sure fridge is suitable between 1˚C and 5˚C);
- Find out what food you have in your pantry and fridge before you go shopping;
- Rotate food storage at home - 'first in, first out!'

At shopping

- Make a shopping list;
- Don't buy when you're hungry;
- Buy only the amount you need (the right package size or bulk foods);
- You can choose fruits and vegetables that are imperfect in terms of external appearance (shape, size), often on sale;
- You can purchase those products that are on sale and that are close to reaching the minimum durability date if you aim to consume them quickly.

At school

- Ask to be served the right portion if you eat in the canteen;
- Disseminate recommendations to colleagues on how we can prevent food waste.

At the restaurant/cafe

- Choose the amount you can eat/drink. Some restaurants/cafes have this option;
- Take home the leftovers.

Family task

Identify at least one measure in order to reduce food waste to implement with family members for one month. At the end of each week, check if everyone has followed this rule.

Post an evidence of following this rule on the Blog.

MODULE 2

Sequence 1. Pollution with household waste

Context

Household waste is usually called garbage. The amount of waste created increases with the global population. In general, waste production increases as human civilizations become more automated and industrialized.

For instance, the industrial revolution brought new manufactured goods and new manufacturing techniques, which increased the amount of industrial garbage and solid waste of origin. The excessive packaging of many products and modern consumerism contribute considerably to the increase in solid waste.

Reducing plastic waste from nature depends on changing our consumer behavior:

- We reduce the consumption of non-degradable or hard-to-degrade materials

- We avoid waste

- We recycle more and throw away less

Among household waste, plastic has the biggest negative impact on the environment.

Plastic is all around us, it is a part of all our lives. Many of us have our first experience with plastic since birth when the midwife puts the plastic identification bracelet on the newborn's ankle. From that moment on, we grow up in a world dominated by plastic.

Plastic products began to be manufactured at the beginning of the 20th century, when Leo Baekeland invented Bakelite, which was quickly used to produce telephones, toys, car parts, building materials. There are currently over 50 main types of plastic. Plastic has found its use in all fields of activity, becoming an indispensable material.

Group activity

Ask students to reflect on the topic of plastic use: its importance in everyday life, at work, how often they use plastic objects, especially disposable ones.

Fields of use of plastic:

- Packaging (about 1/3)
- Pipes and plumbing (1/3)
- Cars (20%)
- Furniture and toys

Like any object, plastic ones also have a useful life after which they become waste. About 95% of plastic packaging worldwide is used only once. Products such as glasses and cutlery made of plastic are only used once before being thrown away.

What do we do with plastic waste when we want to get rid of it? People tend to choose the most convenient way to get rid of them:

1. *They throw them in the trash without selecting them and from there they end up in the landfill.*

2. *They throw them away haphazardly, especially when they're out and about and don't have a trash can nearby.* Often such plastic waste ends up in lakes, rivers and from there further into the seas and oceans.

What is the biggest problem with plastic waste? Plastic does not degrade, so all the plastic ever made still exists on the surface of our planet. If exposed to sunlight for long periods, the plastic can become brittle and break into smaller

pieces. A plastic bottle floats in the ocean for about 450 years to break down into smaller and smaller fragments. **They will never fully disappear.**

3. *Recycling.* More and more people are getting involved in selecting plastic waste to be collected by specialized companies. These companies deliver plastic waste to companies specialized in its recycling. And yet recycling plastic is more difficult than other materials such as glass, paper, textiles. The main problem is that the melted plastic must be of the same type. Also, the dyes and additives used in plastics make it more difficult to recycle.

Did you know that...

Every time you wash synthetic clothing, tiny strands of plastic like nylon and acrylic (called microfibers) are washed out of the clothing and they get into the washing machine waste water. It is estimated that in one wash a washing machine releases up to 700,000 microfibers.

Since they are too small to be filtered out by water treatment plants, these microfibers could also be in our drinking water. Research has shown that 83% of tap water samples taken from various places around the world were contaminated with microscopic plastic fibers.

These microfibers have also been found in bottled water. Scientists found about twice as many plastic particles in bottled water than in tap water.

Recycling plastic waste is quite a demanding process and cannot be done for every type of material. That's why people should be very careful about what they buy and how they store it inside the garbage containers.

There are several recyclable plastic materials but there are others that cannot go through such a process. All products made from this recyclable material have the triangle symbol called the Möbius loop. It was first implemented by the Society of Plastic Industry in 1988. Inside it there is a number, usually from 1 to 7 – representing how easily the plastic can be recycled.

PET (polyethylene terephthalate) is used in the manufacture of beverage bottles. It can be recycled most easily.

HDPE (High Density Polyethylene) is a high density material found in milk containers, cosmetic packaging, cleaning products, garden furniture, baby bottles, containers, storage boxes and other products that require resistance. It is not affected by strong heat, which makes it perfect for such packaging.

PVC (polyvinyl chloride) is found in pipes, cables, window frames, medical products, footwear, etc. It is a very durable plastic, but light at the same time, it is fire and weather resistant. PVC is considered among the most harmful and dangerous plastics that cannot be recycled.

LDPE (low-density polyethylene) is found in grocery bags, garbage bags, flexible bottles, and recycling this can produce other new plastic bags.

PP (polypropylene) is an extremely rigid plastic, but with a very low density, which makes it resistant to heat and quite easy to recycle. Bottle caps, food packaging and drinking straws are made from polypropylene. After it is recycled it can be reused.

PS (polystyrene) is often found in construction, plumbing, toys, medical tubes because it can be a good insulator and withstand shock. However, its exposure to heat is considered toxic.

A final category is the mixed one, which includes plastic materials that cannot be recycled, because they have a much too complex composition. These include polyurethane, acrylic or polycarbonate.

How to recycle plastic correctly

• Any plastic container must be cleaned before being inserted into the container intended for the material.

• Plastic bags must be clean and tightly packed to be recycled.

• The labels on the packages will be removed before throwing them away.

• The bottles must be flattened and with the cap on.

When these procedures are not followed, most products end up being excluded from the recycling cycle and end up in landfills, where they can sit for decades to hundreds of years until they decompose.

Click the link below to learn how to collect
plastic waste correctly
https://www.youtube.com/watch?v=5LBZdMavnFg

How you can reduce plastic pollution

1. Buy more bulk food and less packaged food!

Supermarkets are filled with disposable containers (polystyrene trays, PET bottles, tetra packs, plastic containers, etc.). But there is an alternative: more and more stores offer the possibility to buy in bulk. to buy in bulk

2. If you go shopping, don't forget to take a canvas bag!

If when we go shopping we use reusable bags (canvas, twine or wicker) the health of our planet will improve. From now on, remember to take one with you when you leave the house.

3. Stop using plastic cups for coffee!

I know it's hard to do that when you're traveling. That's why I suggest you give them up when you're at work or school. A softer option is to use cardboard cups, but they also contain plastic (even if in small quantities). It is best if you use glass or ceramic cups or mugs.

4. Use your own reusable water bottle!

You can choose to use reusable plastic bottles that you can use for a longer time. If it is not too inconvenient you can use glass containers.

5. Say NO to plastic cutlery!

There are alternatives to these objects that are disposable: those made of wood, of metal that can also be reused or even of compostable plastic.

6. Give up plastic straws!

Plastic straws and stirrers are disposable items that pollute the environment after use. You can use paper ones as an alternative or ... give them up. It is not difficult at all.

7. Give up the plastic cling film!

Unlike cling film which cannot be recycled, paper film is recyclable. So if you use cling film for wrapping, make sure you put it in the recycling bin after use! Another alternative is the new ecological films with beeswax. Made from 100% cotton, pine resin, jojoba oil and local beeswax, they are 100% natural and eco-friendly. This means no pests will get into the food while it's in storage, it's reusable and compostable, stopping plastic pollution. Plus, they come in fun patterns!

8. Beware of tea bags!

Use loose leaf tea with a tea strainer instead of tea bags that are sealed with plastic. Throwing away tea bags can contribute to the pollution problem. Soaking a plastic tea bag can release 11.6 billion microplastic particles into a cup of tea. Things are changing, though: biodegradable tea bags have recently appeared **tea bags have recently appeared.**_

9. Choose wine bottles with natural corks!

Choose wine bottles with natural cork stoppers instead of plastic stoppers or metal screw caps (which contain BPA, an industrial chemical used in the manufacture of certain plastics).

10. Choose glass or steel food containers!

If you eat at work/school, you may use a plastic box to transport your food. We suggest you change the routine and choose glass or stainless steel containers. Not only will the planet appreciate it, but so will your health, as some of these plastic containers can release harmful substances.

11. When washing, use wooden hooks instead of plastic ones!

Even the smallest actions can have a major positive impact on our planet. For instance, an easy routine action such as hanging clothes to dry can become an extraordinary act if we switch from plastic to wooden hooks.

Suggested activity

Challenge the participants to a discussion on plastic waste.

1. How do you get rid of them at home, at work or at school and also while traveling?

2. On a scale from 1 to 10, where would they place their responsible behavior regarding the reducing of plastic consumption and its recycling?

3. Challenge them to identify behaviors they can use to reduce plastic use in the next 30 days.

Selective collection of household waste

YELLOW bin: PLASTIC AND METAL

YES: plastic cans and boxes, plastic bags, plastic packaging, plastic toys, beverage cans, cans, Tetra Pak boxes (milk and juice cartons), etc.

NO: mixed metal and plastic products, construction polystyrene, paint cans, thinners or other hazardous chemicals, medical waste (for instance used syringes) etc.

GREEN bin: GLASS

YES: glass containers (without lids), jars (without lids), demijohns, glass containers from cosmetic products, etc.

NO: mirrors, glass, porcelain, ceramic, crystal/heat-resistant dishes, etc.

BLUE bin: PAPER AND CARDBOARD

YES: magazines, newspapers, waste paper, envelopes; boxes, photos, egg cartons, pizza boxes, etc. (clean and dry)

NO: paper and cardboard containing food residues, used napkins and paper towel, glossy wrapping paper.

BROWN bin: BIO-WASTE

YES: fresh or cooked fruit and vegetable scraps, bread and cereal scraps, coffee grounds/tea scraps including tea bags, egg shells, nut shells, stove ash (when only wood is burned), sawdust, hay and straw, vegetable scraps from the yard (shredded leaves, twigs and canes, flowers), house plants, pieces of shredded wood, newspapers, shredded cardboard - wet and dirty, paper tissues.

NO: leftover meat and fish, cooked or fresh scraps, leftover dairy products (milk, cream, cheese, yogurt, butter, cream), whole eggs, animal fats and vegetable oils, pet excrement, stove ash (if coal is also burned), plant residues from the yard treated with pesticides, treated or painted wood.

BLACK bin: HOUSEHOLD WASTE

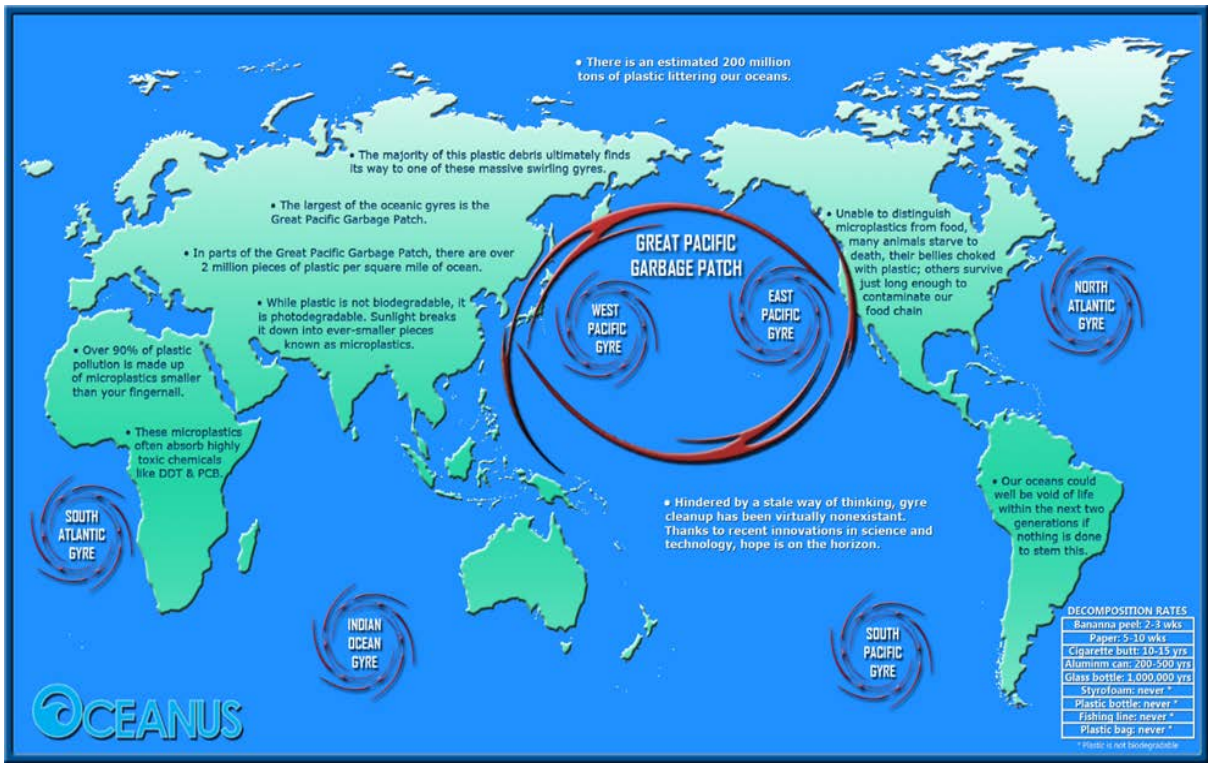
YES: food scraps (meat, dairy, vegetables, eggs), disposable diapers, absorbents, pet waste/excrement, vacuum cleaner bag contents, cigarette butts, used tissues, heavily soiled packaging, ceramic and porcelain shards, very dirty disposable tableware, ash from stoves (if coal is also burned in addition to wood), vegetable scraps from the yard (if treated with pesticides), treated or painted wood, etc.

NO: Textile waste, footwear, soil, sand, gravel, electrical and electronic waste from equipment and batteries, vehicle components (dismantled parts), tires, construction and demolition waste, bulky waste (furniture, carpets, mattresses, etc.)

Ocean pollution

| Online activity |

Plastic doesn't just pollute land. It reaches different paths in seas and oceans where real plastic islands have already formed.



Click the link below to see the Great Pacific Garbage Patch

https://www.facebook.com/watch/?v=505571183254372

The Great Pacific Garbage Patch is an area of accumulation of a multitude of plastic waste (plastic bottles - PET, nylon (plastic) fishing nets, floating objects, shredded plastic, etc.). It covers 1.6 million square kilometers.

• **Plastic coming from the ocean** already represents more than 150 million tons of waste.

• By 2050, the oceans could contain more plastic than fish.

• Each year, approximately eight million tons of plastic end up in Earth's seas and oceans.

What are the effects of plastic on marine life?

Large plastic debris floating in the oceans can kill animals such as dolphins and whales. Plastic bags floating underwater are eaten by turtles who mistake them for jellyfish. They block their digestive systems and starve.

Layson albatrosses are large seabirds that live in the Pacific and feed on fish and squid. They swallow the plastic which creates the feeling of satiety even more by starving them.

Toxic chemicals floating in the oceans are attracted to plastic and often "stick" to it, so when fish eat small pieces of plastic, they are also eating the toxic chemicals. Small fish feed on tiny pieces of plastic. The larger fish that eat them accumulate a higher dose of pollutants because they eat a lot of smaller fish. As you go up the food chain, pollutants become more and more concentrated. At the top of the food chain are us humans.

A remote, tiny, uninhabited island in the Pacific Ocean called Henderson Island has the highest density of plastic trash found anywhere in the world. There are almost 18 tons of plastic, broken into 37.7 million separate pieces. The crabs have been found living in pieces of trash such as cosmetic packaging and plastic bottle caps. How did all this plastic get there? The island is almost the Center of the Pacific. By means of a huge rotating current that collected all this garbage.

There are beaches on the Pacific islands that seem to be covered with sand of different colors. They are actually tiny pieces of plastic that have been broken into tiny pieces.

Sequence 2. Carbon footprint

Context

The terrestrial environment is a dynamic environment that is constantly evolving. Climate, as part of the terrestrial environment is subject to this change. Throughout the Earth's history there have been periods of climate warming but also glacial periods or ice ages. They were the result of terrestrial processes and phenomena but also of cosmic phenomena. An important role in climate change is the variation of carbon dioxide in the atmosphere. The share of carbon dioxide emissions is influenced by various terrestrial phenomena such volcanic eruptions.

With the advent of industry (at the beginning of the 19th century) man became a major emitter of CO2 into the atmosphere by burning fossil fuels. But other economic activities, such as agriculture, contribute to the increase in CO2 in the atmosphere.

If until the middle of the 20th century, Europe and the USA were responsible for the majority of CO2 emissions (85%), today their share in total CO2 emissions has decreased to less than a third. Instead, Asia and especially China are currently responsible for most of the CO2 emissions.

There was a need to limit CO2 emissions into the atmosphere and to identify the human activities that emit the most greenhouse gases, especially CO2. For this, an indicator called Carbon Footprint was invented.

The carbon footprint (CO2 footprint) represents the totality of greenhouse gas emissions emitted into the atmosphere, generated by companies, households and each individual, as a result of current activities, during a certain calendar interval. These emissions can be direct or indirect and are equivalent in tons of CO2. The Committee on Climate Change (CCC) recommends that a person's carbon footprint is approximately 1 ton per person. Reducing greenhouse gas emissions can improve air, water and food quality for our generation and for generations to come.

The personal carbon footprint is a tool used to assess how a person's actions affect the environment. Its calculation allows you to adjust your consumption patterns and minimize or optimize energy efficiency to reduce your environmental impact. Our carbon footprint negatively impacts the environment in many ways: it is the leading cause of human-induced climate change, it contributes to urban air pollution, it leads to toxic acid rain, it adds to coastal and ocean acidification and it worsens the melting of glaciers and polar ice caps.

Students have to realize that any activity made by each of us, such as the use of the Internet, electricity, domestic water use, travel and other similar things, contributes to the increase of greenhouse gas emissions that can be expressed by using the phrase ***"carbon footprint".***

Individual task

1. Click the link below to calculate your individual carbon footprint **footprintcalculator.org**
2. Identify 3 common activities that increase your personal **carbon footprint.**

How can you reduce your carbon footprint?

Here are some changes that can make a difference.

Food

• Eat local and seasonal products

• Reduce meat consumption, especially beef

• Choose sustainable fishing

• Use reusable bags and avoid products with too much plastic packaging

• Buy only as much as you need and avoid waste

Clothes

• Keep your clothes as long as possible

• Try swapping, borrowing, renting or buying second hand clothes

• Buy clothes produced responsibly (e.g. from recycled materials or with an ecological label)

Transport

• Use the bike or public transport

• Choose wisely when and how you are going to drive

• Travel by train on your next vacation

Energy and waste

• Turn down the thermostat by 1˚C in order to save energy

• Take short showers

• Turn off the water while brushing your teeth or washing dishes between wetting and rinsing

• Unplug electronic equipment and don't leave your phone charging when the battery is already full

- Do not store unnecessary data on the cloud (fingerprint details)
- Choose energy efficient products with the "A" label (EU energy label)
- Produce as little waste as possible and recycle as much as possible.

Family task

Identify at least 3 ways to reduce your carbon footprint and put them into practice for 30 days.

Show others that you are involved. Post evidence on the Blog: photo, video, etc.

Online activity

Watch the 3 videos below to better understand the impact of human activities on Earth's climate.

https://www.youtube.com/watch?v=8q7_aV8eLUE

https://www.youtube.com/watch?v=YseZXKfT_yY

https://www.youtube.com/watch?v=jAa58N4Jlos

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14. https://www.overshootday.org/
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