

A CONTRIBUTION BY OUR CLUB MEMBER

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**SAVE THE ENVIRONMENT**



### Introduction:

Humanity has witnessed in recent decades to technological development and industrial impressive, especially in the chemical industry that has served humanity and all this depends on the environment. But given the ignorance of studies of impacts of this development on the environment and the lack of exploitation of natural resources, land attends many physicochemical phenomena that have an adverse effect on the earth. One of the major threats is global warming which is a topical issue given its rapid development especially at the polar regions and the consequences may be because recent data have shown that the intensification of this phenomenon. This data reflects that global warming is an issue with a view that the dangers that can present this phenomenon are very harmful and which call for maximum acceleration in global efforts to try to prevent damage and reduce the consequences even if it is already too late given the critical level reached by this phenomenon.

Since this is a problem that involves simultaneously the natural dimension of the planet and human society that lives, we must think about global warming in an interdisciplinary perspective.

### What global warming?

It's can define in a small definition is a natural evolution of the temperature of the Earth; Global warming is the increase in the average surface temperature of the planet. It is due to greenhouse gases released by human activities (industry, transport, agriculture, ...) and trapped in the atmosphere. During the twentieth century, the temperature has risen by  $0.6^{\circ}\text{C}$  on average. The average warming could reach  $1.4^{\circ}\text{C}$  to  $5.8^{\circ}\text{C}$  by the end of the twenty-first century .. The natural history shows that the evolution of the thermal conditions of the surface of the earth has not produced by a uniform process. Warmer periods alternating with periods less hot throughout the natural and human history of the planet. .

### Causes of global warming:

#### § **Man responsible for global warming?**

Man, through its activities such as industry, traffic and agriculture, which produces gases amplify the natural **greenhouse** effect:

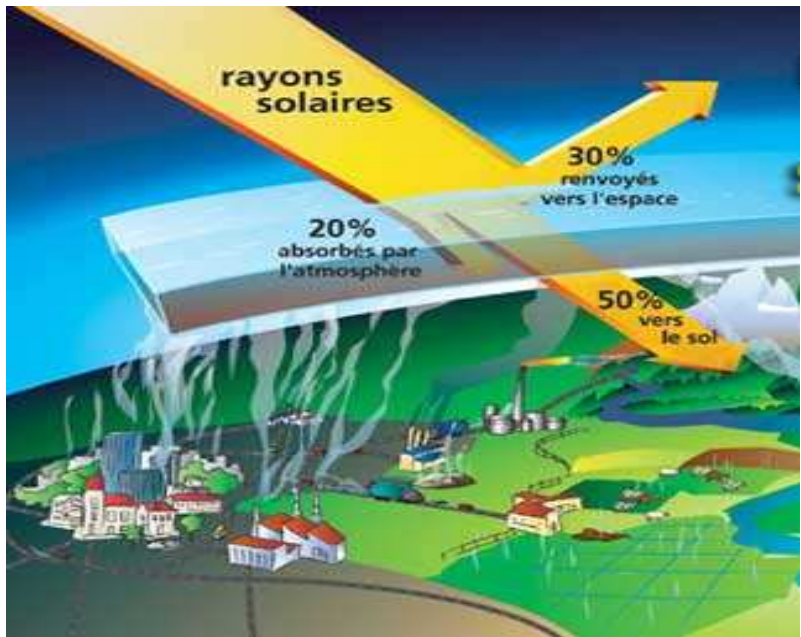
**What is it?**

The greenhouse effect is a natural process that allows the earth not to become a glacier. without which life would not have developed on Earth.

Without greenhouse gases, the average surface temperature of the Earth would be around -18 ° C instead of 15 ° C today. The greenhouse effect is the phenomenon responsible for the warming of the planet.

**How it works?**

The sun's rays enter the atmosphere and warms the surface of the earth. Then they go back to escape, taking with them the heat (infra red), but the greenhouse gases, like carbon dioxide and methane (the principal) trap the sun's rays and then refer to the ground making it possible to warm the surface of the earth



**Who are "greenhouse gases"?**

The greenhouse gases are extremely diverse. Some of these gases are "natural", ie they were present in the atmosphere before the appearance of humans and result from both natural and anthropogenic processes (carbon dioxide, the methane, nitrous oxide ...). Others are "artificial", ie exclusively produced by human activities. These are industrial gases such as halocarbons, for example. The main greenhouse gases are:

- Water vapor (H<sub>2</sub>O): comes from electricity, irrigation, dams, deforestation ... but anthropogenic emissions are not sufficient to disrupt the global water cycle, because the planet is covered 2 / 3 and water accumulates in the atmosphere no more than a week .

- Carbon dioxide (CO<sub>2</sub>) is alone responsible for **65%** of the anthropogenic greenhouse effect and the duration of his stay in the atmosphere is 100 years. Half the CO<sub>2</sub> in the atmosphere is produced by men: this is equivalent to 7 billion tons of carbon per year, or 4 kg per inhabitant per year. That gas comes mainly from burning fossil fuels (coal, oil, gas), certain industries (eg cement production) and deforestation, particularly in the tropics.

- Methan (CH<sub>4</sub>) produces approximately **20%** of anthropogenic greenhouse. It's a gas 23 times more potent than CO<sub>2</sub>. The duration of stay in the atmosphere is 12 years.

- Nitrous oxide (N<sub>2</sub>O) generates approximately **5%** of anthropogenic greenhouse. It is a gas 298 times more potent than CO<sub>2</sub> that comes from the use of nitrogen fertilizers in agriculture, and certain chemical processes. The duration of stay in the atmosphere is 120 years.

- Halocarbons: generate approximately **10%** of anthropogenic greenhouse. They have a considerable warming potential: thousands of times the mass of CO<sub>2</sub> equal and their length of stay in the atmosphere up to 50 000 years.

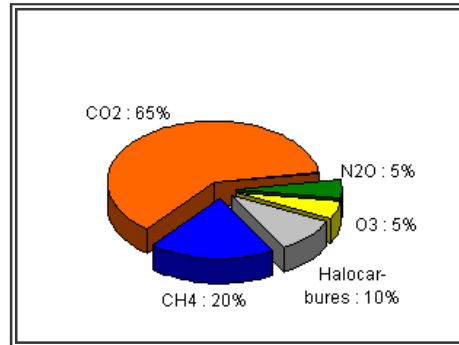
- Ozone (O<sub>3</sub>) tropospheric generates about **5%** of anthropogenic greenhouse. This is a variation of the oxygen that is naturally present in the atmosphere. In the stratosphere, ozone stops the sun's ultraviolet who tend to "break" the chemical bonds essential to life. It is therefore very useful: not the stratospheric ozone layer life would probably not advanced beyond the oceans. In the troposphere, ozone is a pollutant very aggressive. It was formed by humans, from the combustion of hydrocarbons.

#### All greenhouse gases are equal?

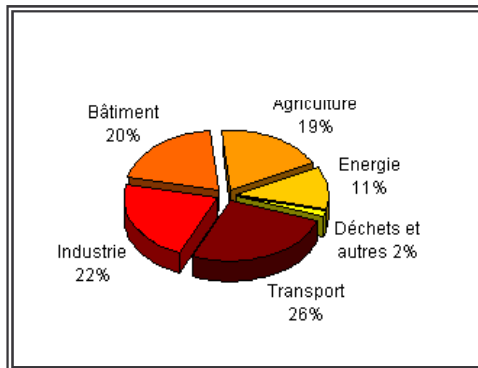
Water vapor, carbon dioxide, methane, nitrous oxide, halocarbons, ozone ... all contribute to the greenhouse effect but the influence of these gases varies according to:

- Their concentration in the atmosphere. With the exception of water vapor, the greenhouse gases are present in the atmosphere in very small quantities.
- Their molecular structure. A molecule of nitrous oxide (N<sub>2</sub>O) has, for example, radiative

power (ability to warm the atmosphere) 296 times larger than a molecule of carbon dioxide (CO<sub>2</sub>).



With these emissions of greenhouse gases, humans have changed the situation as if the Sun had increased its power by about 1%. This may seem low. Yet, given the enormous energies involved, the fragility of certain natural balances, and that these effects act over long periods is very significant for our future



§ **The nature, responsible for the warming?**

**The Sun:** The amount of solar radiation received by the Earth can certainly cause changes in climate. Richard C. Willson, American climatologist, the sun shining act more and more. Indeed, the luminosity of the Sun appears to rise slowly: + 0036% between 1986 and 1996. At this rate, the temperature would rise by 0.4 ° C by 100 years and 2 ° C if one takes into account the CO<sub>2</sub> emissions. However, other researchers are skeptical about the findings of Willson: measures are imprecise because muddled by the emergence of sunspots and faculae.

**Wetlands:** Methane (CH<sub>4</sub>), greenhouse gas, is produced in wetlands such as marshes, where oxygen is scarce. Indeed, this gas is formed when an organic compound (an animal, a

plant) breaks down, particularly if this decay occurs without oxygen, for example under water or underground.

Livestock are also responsible for about **15%** of methane emissions: the digestive tract of animals offers ideal conditions for bacteria which produce this gas.

The climatic phenomenon El Nino: it appears to the festive season along the coasts of the South American Pacific and occurs with varying intensity every 3 or 5 years. Due to a shift in meteorological equator, the winds reversed and the sea temperature rises several degrees. This actually extends to the entire tropical Pacific and are interested in both the ocean than the atmosphere. In a year, "El Niño", the areas of training of moving cyclones, hurricanes vary in intensity, the action centers shift. The whole world is concerned (drought or floods). The ecological balance is upset.

The consequences of global warming:

Contrary to a widely shared, it is not certain that global warming causes more drought. Indeed, in contrast, experts believe that the increasing heat, evaporation of the oceans is more important. This would be the rain that would be greatest. Several analysts believe that the repetition of many floods in the Mediterranean area since the 1990s, would come from the warming. In general, the rains are expected to intensify in the Dry Areas. However there are also significant geographical differences. Thus, the zone might be not equally affected as other areas.

○ In terms of nature:

ü Climatic instability:

This is the major risk of global warming. Natural disasters such as tornadoes, storms, cyclones, will be more frequent than today. Indeed, the water cycle will be accelerated because the evaporation is more important.

Ocean currents that regulate temperatures, such as the Gulf Stream to Europe, could be modified. Without the warming influence of the Gulf Stream, Western Europe would experience the same winter temperatures as Canada.

ü *The rising level of seas and oceans:*

This comes from two elements. First, the melting of glaciers is already amply confirmed (glaciers of Greenland and Antarctica in particular). But foremost the expansion of warming water, causing a rise in water level.

The absolute humidity. Obviously mean absolute humidity of the air will increase. Knowing that water is the main vector of thermodynamics atmosphere (evaporation absorbs energy and condensation restores) the power of precipitation would also increase.

ü *Flooding:*

When it's warmer, the water cycle is accelerated. Evaporation and precipitation are therefore more importantes. C is the phenomenon that already know the tropics for example.

The overflow of rivers and widespread floods will affect all the people who live on the water. Or 80% of the world's population lives near the sea coast or streams

ü *Desertification:*

At the same time, warming exacerbates drought and desertification. Some seas (Aral Sea, Dead Sea) evaporate almost entirely. Southern Spain could become a semi-desert by 2050. On the other hand, over the deserts will expand and the temperature will rise as the desert reflects more light than the forest.

The extinction of animal and vegetation 15 to 30% of plant and animal species will disappear by 2050 under the impact of global warming according to a study published in the scientific journal "Nature". It is therefore a mass extinction comparable to that which caused the disappearance of the dinosaurs.

○ *In terms of economics:*

ü *Agriculture and fisheries:*

Agriculture and forestry will be adversely affected. In developed countries, it has become specialized, is based on a small number of species. When climatic conditions change, it is very vulnerable. All cultures may lack water. In France, the vines are very sensitive to such stress hydrique.

ü *Electricity production:*

With the decline in the level of rivers and dams, hydropower production will be greatly diminished. But all the thermal power or nuclear are concerned, because they use the river water to cool. Last summer during the heatwave, France had to buy electricity to its neighbors to avoid cuts.

ü Tourism:

Since 1960, the snowpack has already declined by 10% in the French mountain. The ski resorts in lower altitudes will have close or convert. Others acquire more and more snow guns and expensive equipment.

The disappearance of sandy beaches due to rising sea level will penalize traditional tourist destinations (Caribbean, North Africa ...)

○ In terms of health:

ü Cardiovascular diseases and respiratory :

People suffer from some chronic conditions are particularly fragile when it's hot. Diseases such as diabetes, respiratory (asthma, chronic bronchitis ...) or renal function may worsen in case of dehydration.

ü Allergies:

With seasonal cycles modified pollen will persist longer, which will affect people with allergies.

ü The scarcity of water:

Water shortages and declining groundwater level may force people to use fresh water sources of poor quality, especially in southern countries. In these conditions, epidemics like cholera are spreading.

ü New diseases:

Tropical diseases, especially those transmitted by mosquitoes (dengue, yellow fever) and ticks (Lyme disease, lung infection, encephalitis) are extended to previously unaffected regions, including Europe. However, people living in these border areas are not immunized against the disease, and epidemics are therefore more serious.

○ In biological and ecological

§ Changes in the food chain to know that certain biological species will be their range increase, but the balance of global warming in terms of biodiversity will be negative

§ At the level of cover and biotopes some natural systems are more affected than others by global warming. The systems are the most sensitive: glaciers, coral reefs, mangroves, boreal and tropical forests, polar and alpine ecosystems, prairie wetlands;

§ The damage on natural systems, either by their geographic scope or intensity will be proportional to the intensity and speed of global warming

The solutions:

What are the actions of governments in the fight against pollution and global warming?

✘ The Kyoto Protocol :

The aim of the Kyoto Protocol is to fight against climate change by international action to reduce emissions of certain greenhouse gases (GHG). This protocol was adopted on 11 December 1997 and ratified on 31 May 2002 by the European community. The Kyoto Protocol is an awareness of the importance of the fight against global warming. Today, 141 countries belong to the Kyoto Protocol. Canada pledged to reduce by 6% GHG emissions compared to the percentage recorded in 1990. The Climatologists believe that the Kyoto Protocol will not suffice to stem global warming.

✘ The IPCC (Intergovernmental Panel on Climate Change)

Is an organization that was established in 1988 at the request of the G7 (Group of 7 richest countries: USA, Japan, Germany, France, Britain, Canada, Italy) by the World Meteorological Organization and the Environment Program of the United Nations. Its role is to assess scientific, technical and socio-economic concerns that the risk of climate change caused by man.

The organization is open to any researcher wishing to give his opinion, then considered by other researchers, but published only if everyone is in agreement with.

How each of us can fight against pollution and global warming?

1-Save Energy:

The low-energy light bulbs use 4 times less electricity than incandescent bulbs, reducing CO2 emissions.

2 - Heat you without wasting

Enhance the thermal insulation of the housing and equipped with mechanical ventilation divided by 3 or 4 the need for heating. A boiler regularly maintained driving down

consumption from 8 to 12%, a boiler "low temperature" or "condensation" of 30 to 40%.  
Develop a regulatory system or programming, it is still 10% of winning!

**3 - Turn off appliances**

Turn off your TV, your DVD player, your stereo and your computer when not in use will reduce your bill and your impact on the environment.

**4 - Leave your car in the garage**

Walk, ride bike, take public transportation more often in common. 1 km in car = 154 g of CO<sub>2</sub> in the atmosphere on average.

**5 - Limit your consumption of hot water**

Take a shower instead of a bath at least divided by two water consumption. Wash at 20 ° C consumes 2 times less than a cycle at 40 ° C.

**6 - Recycle more**

By recycling your waste, you reduce your annual CO<sub>2</sub> emissions.

**7 - Drive slower**

Run at 120 km / h instead of 130 km / h saves you 8 euros over 500 km.

**8 - Save Forests**

They can absorb large amounts of CO<sub>2</sub>.

**9-Use only disposable products wisely**

Let mono to sustainable use, whenever possible.

**10 - Check your tires**

Tires under inflated, even only 0.3 bar, it's dangerous and it consumes more!

Conclusion:

The Earth's climate has changed over the last century. There are new stronger evidence that most of the warming observed over the past 50 years is attributable to human activities. According to current projections of climate models, rising temperatures will continue in the 21st century because of greenhouse gases and should affect both negative and positive in nature and man.

The impacts will vary by region but we can now determine their exact nature, especially on a small scale. However, it is expected that:

- ü More on issue of greenhouse gases over the planet warms,
- ü Warming will be more important and faster, the impact will be negative

Many options are available to reduce these emissions and their cost must be weighed against the risks to future generations.