

Research Report

COMMITTEE : World Meteorological Organisation (WMO)

ISSUE : What measures should be implemented to assess and regulate pollution?

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WHAT MEASURES SHOULD BE IMPLEMENTED TO ASSESS AND REGULATE POLLUTION ?

INTRODUCTION

Committee



The World Meteorological Organisation (WMO) is the United Nations (UN) specialised agency for weather, climate and water resources. It is also the scientific voice of the United Nations on the state and behaviour of the Earth's atmosphere and climate. WMO currently has 193 Member States and Territories, and since weather, climate and the water cycle know no national boundaries, effective international cooperation at the global level is essential for the sustainable development of meteorology and hydrology. WMO assists its Members in monitoring the Earth's climate on a global scale to ensure that reliable information is available to support evidence-based decision making on how best to adapt to a changing climate and manage the risks associated with climate variability and extremes.

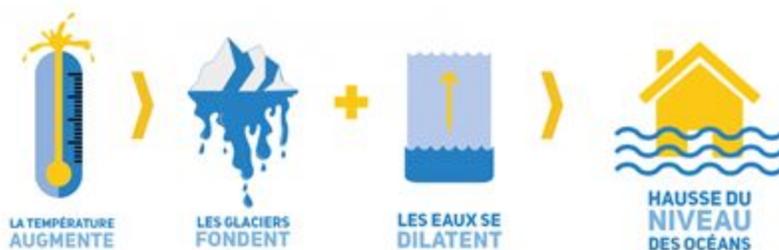
WMO is the successor to the International Meteorological Organization (IMO), which was established in 1873 at the International Meteorological Congress in Vienna. Established after the ratification of its Convention on 23 March 1950, it became, one year later, the United Nations specialized agency for meteorology (weather and climate), operational hydrology and related geophysical sciences. The Secretariat, based in Geneva, is headed by the Secretary-General. The World Meteorological Congress is the supreme organ of the Organization.

Issue

"We live on the only planet where life is possible according to our knowledge today. Yet human beings are causing the sixth mass extinction," the Special Rapporteur on Human Rights and the Environment, David R. Boyd, told the Human Rights Council in February 2019.

Since the industrial revolution, carbon dioxide levels in the atmosphere have reached over 400 parts per million (pollutant molecules found in one million air molecules). These are the highest levels in 650,000 years. These levels are causing dangerous and unpredictable climate change. Indeed, these changes are having irrevocable consequences with almost 90% of the world's population exposed to air pollution. In addition, air pollution causes seven million premature deaths worldwide each year, including 600,000 children aged five years or less. On average, a human life ends prematurely every 5 seconds, or 800 deaths per hour, due to exposure to air pollution. Moreover, "Extinction rates are hundreds of times higher than normal, indicating that humans are responsible for the sixth mass extinction in 3.8 billion years of life on this planet," added David R. Boyd. "This is more deaths than those caused by war, murder, tuberculosis, AIDS and malaria combined," Boyd insisted.

Furthermore, air pollution is one of the primary causes of global warming, which leads to a rise in average temperatures on Earth, which in turn causes glaciers and the poles to melt. All this causes the rise in sea levels, which could well lead to various coasts being submerged by 2100. Moreover, according to the WMO's State of the World Climate Statement 2019, the year 2019 is probably the second warmest year on record since instrumental records began, with an average global surface temperature 1.1 ± 0.1 °C higher than in pre-industrial times. As a result, in 2019, mean sea level was the highest ever recorded.



Sea level rise

Source : Surfrider

But air is not the only element polluted by human beings, the oceans are also enormously affected by pollution. Pollution from land-based sources (such as agricultural pollution, discharge of fertilisers, pesticides and untreated waste including plastic waste) accounts for about 80% of marine pollution worldwide. Worldwide, marine habitats are contaminated by debris caused by humans. Oil spills also remain a cause for concern, although their numbers have been steadily declining for



several decades. But the harm caused to marine creatures by these pollutants, particularly plastics, remains a concern. In addition, since 1980, the oceans have absorbed about 20-30% of CO₂ emissions, resulting in ocean acidification, which is a gradual decrease in their pH. As a result, it has been estimated that from 1751 to 2004, the pH of the surface waters of the oceans decreased from 8.25 to 8.14. This is another problem caused by the increase in carbon dioxide emissions into the atmosphere since the industrial revolution.

KEY WORDS

Pollution: The degradation of the environment by substances (natural, chemical or radioactive) or waste (household or industrial). Although it may have an entirely natural origin (e.g. volcanic eruption), it is mainly related to human activities.

Meteorology: Science that studies atmospheric phenomena, particularly with a view to making forecasts.

Mass Extinction : A biological crisis or mass extinction refers to a period of rapid and massive disappearance of species (animal and plant).

Submergence Coast: An area of submerged continental landform due to sea level rise.

Atmosphère: A gaseous envelope surrounding a planet. Enveloppe gazeuse entourant une planète.

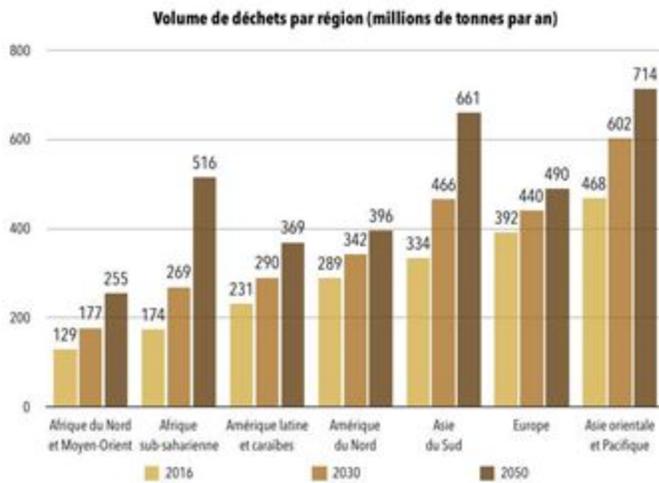
Global warming: Ecological phenomenon characterised by a rise in the temperature of the atmosphere and ocean surfaces at a global level.

Greenhouse gases: gases that absorb some of the sun's rays and redistribute them as radiation and heat within the Earth's atmosphere. gaz qui absorbent une partie des rayons solaires en les redistribuant sous la forme de radiations et chaleur au sein de l'atmosphère terrestre

OVERVIEW

ENVIRONMENT

The harmful actions of mankind on the environment are unprecedented, and extend over the long term. These actions have serious consequences for living beings as well as for natural ecosystems. We are polluting our planet more and more, through our excessive emissions of fossil fuels and greenhouse gases, through our increasingly intensive and polluting agriculture with pesticides, but also through the tons of waste we have to dispose of.

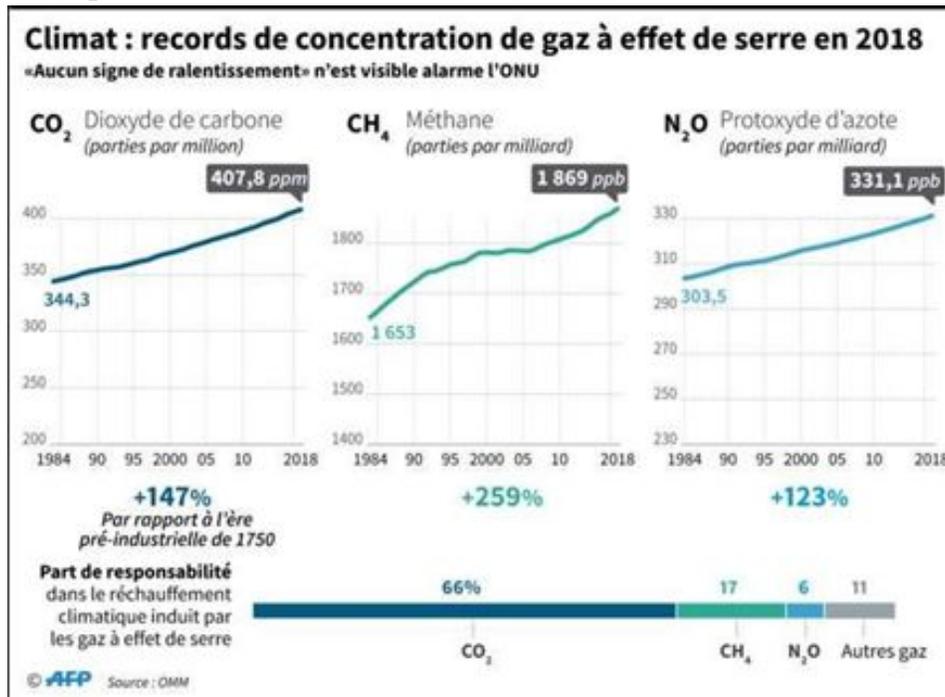


Waste weighs heavily in the balance as far as pollution is concerned, because today only 9% of plastics in the world are recycled, with the result that 91% of plastic waste is thrown into nature and the ocean, destroying natural and marine ecosystems, or is incinerated, releasing toxic fumes into the air and slowly killing people living on Earth. Moreover, if we do not find a way to manage our waste soon, by 2050 the number of waste in nature will have doubled, and the waste will then be even more polluting.

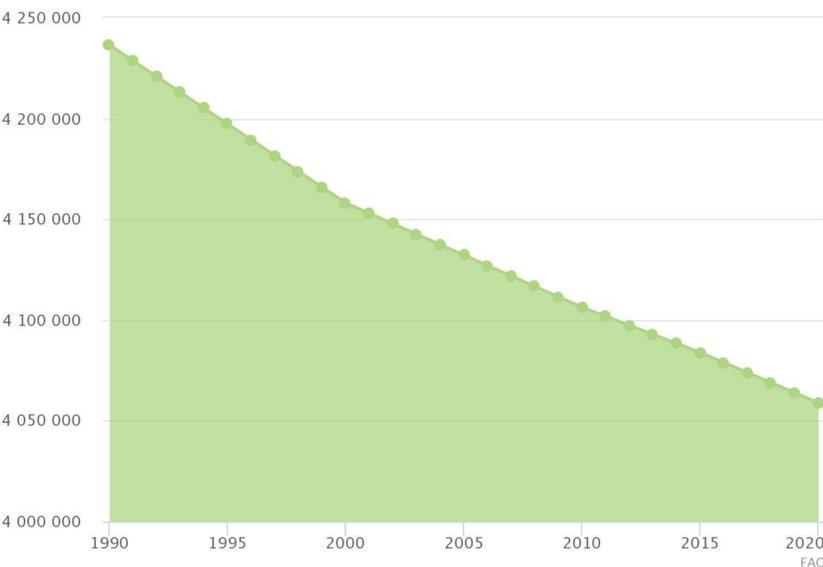
Municipal waste generation by region en 2016, 2030 et 2050.

Source : Céline Deluzarche, according to the World Bank, 2018

Today, as mentioned earlier, carbon dioxide levels in the air are the highest recorded in 650,000 years, at 400 parts per million. Between 1990 and 2018, the use of greenhouse gases increased by 43%, and carbon dioxide accounts for 81% of this increase. So we have increased our use of CO₂ by 81% in just 28 years. As shown in the diagram opposite, global CO₂ emissions account for 66% of global warming, and are therefore a factor in the rise in sea levels, but also an extreme factor in pollution.



Agriculture is also a major contributor to the pollution of our planet, because as the number of people on Earth continues to increase, agricultural production must also increase in order to provide food for everyone. However, in order to produce more and faster, farmers need a lot of space, so they cut down forests in order to have more agricultural space to exploit, thus causing another problem, deforestation. Deforestation is a very serious danger for certain endangered animal species that are losing their habitat, but also for very old tribes that have lived in these forests for centuries and are in danger of disappearing because they no longer have any land. Moreover, forest ecosystems recycle carbon and as such play a major ecological role in the global balance, but by destroying these forest ecosystems we are jeopardising this global balance, because much more CO₂ is released into the atmosphere than can be recycled by trees. Another big problem with agriculture is the pesticides that are used to produce more, but which are very harmful to the surrounding ecosystems and to human health. Indeed, some of these pesticides cause diseases in humans, and are also highly polluting in the atmosphere. But pesticides also pollute the soil, polluting the water we drink from underground, and also making this land infertile and therefore unusable for some time after certain harvests, forcing farmers to cut down more and more forests.



Evolution of the world's forest area (1 unit = 1,000 ha)

Source : Climat.be



FIGURE 06

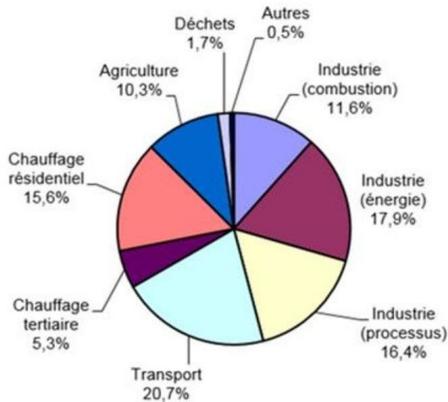
Les voies et mécanismes de dispersion des produits phytosanitaires dans l'environnement.

Source : la Chambre d'Agriculture de la Réunion

ECONOMY

Nowadays, the global economic system is overwhelmingly dependent on the exploitation of fossil fuels, which is estimated to account for around 21% of global CO₂ emissions. However, it also depends on different economic sectors, such as agriculture, transport, industry and heating, all four of which are also among the most polluting economic sectors. Indeed, as we can see on the diagram below, taken from the climat.be website in 2013, agriculture on a global scale represents approximately 10.3% of CO₂ emissions, industry in general represents approximately 45.9% of these emissions, transport represents 20.7% and heating approximately 20.9%.

Part des différents secteurs dans les émissions totales en 2013 (%)



today's poor waste management is endangering the existence of many animal species already on the brink of extinction.

SOCIETY

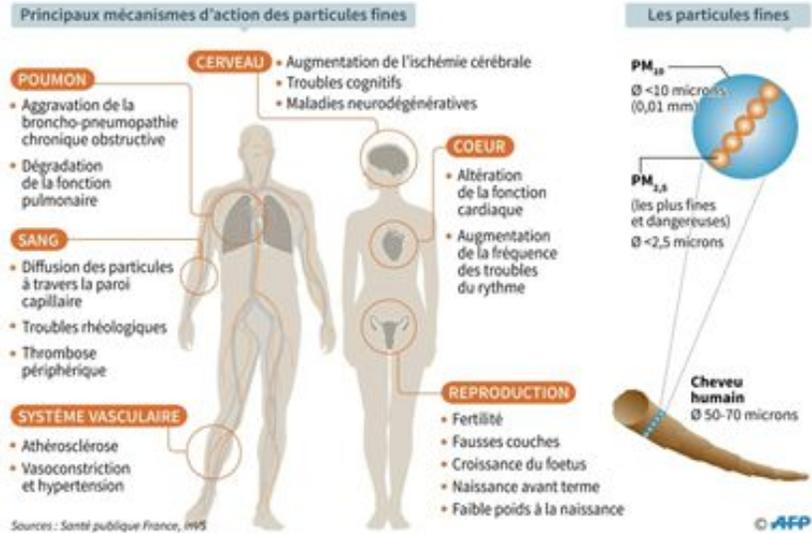
Populations

Pollution has had a huge impact on society. Indeed, it is extremely harmful and is the source of more than 7 million premature deaths every year, 600,000 of which are among children aged five years or less. But even if it does not necessarily kill, it nevertheless causes serious health problems. As shown in the diagram below, pollution can cause problems with the brain, lungs, heart, blood, vascular system and even reproduction in women. In addition, people are also directly affected by pollution, because if sea levels continue to rise due to global warming caused by air pollution, then millions of people will be forced to move because their homes will be under water. The cities most affected by this submersion are Shanghai and Hong Kong in China and Hanoi in Vietnam, but they are not the only ones. Entire islands, including small island developing states, are at risk of disappearing entirely.

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Les effets de la pollution de l'air

La pollution de l'air due aux particules fines est responsable de 48 000 décès par an en France



The effects of air pollution
Source :
Santé Publique France, 2016

These large cities threatened by rising water level

Source : Statista, 19/09/2019



Ecosystems and Biodiversity

Pollution has very serious consequences on marine and terrestrial ecosystems and biodiversity. For example, due to waste in the oceans and its acidification, many marine species and marine plants are threatened with extinction because they are unable to adapt to the new man-made marine environment. This is also the case for terrestrial species. The main causes of the loss of terrestrial ecosystems and biodiversity are deforestation and agriculture. Deforestation leads to the loss of many forest ecosystems and causes the loss of habitat for many animal species. Agriculture, on the other hand, and the huge use of pesticides which define it and which are extremely harmful to both animals and plants, also causes this loss of biodiversity. If we continue to pollute as much as we do now, then in the centuries to come about 75% of animal species are doomed to disappear, some even before they are discovered.



The extinction rates of different living families

Source : Novethic, April 2019

Even though the Earth is about 4.543 billion years old, and has already experienced five mass extinctions, the last being that of the dinosaurs 65 million years ago, this mass extinction is the first to be caused by man. Indeed, very few, if any, of the species extinctions of the last 100 years would have occurred without the involvement of mankind.

Mentalities

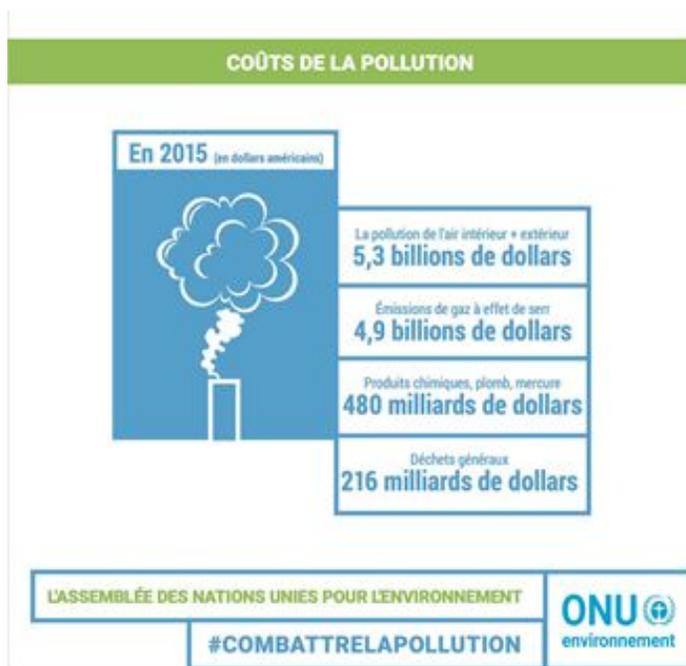
Although pollution has had a very negative impact on the planet, it has raised awareness among young people. Indeed, with figures such as Greta Thunberg, millions of high school and university students have become aware of the danger of pollution and are fighting against it and the repercussions it causes.

For example, it is from this awareness of young people that the Youth for Climate movement was born, a movement of young people who are mobilising for climate and social justice, environmental protection and biodiversity. Their strongest action took place on Friday 15 March 2019, after a call for a demonstration by Greta Thunberg. In total, throughout the world, more than 2 million high school and university students came out of class and went to demonstrate in order to raise awareness and sensitize as many people as possible, and to denounce the inaction of political leaders.



GOVERNMENT

Pollution represents a huge cost to the world's various governments in economic terms. Indeed, according to the World Health Organisation (WHO) in 2016, the economic cost of air pollution in Europe was 1,600 billion dollars, or 1,400 billion euros. This cost in the world today amounts to almost 3 trillion dollars per year, or, otherwise presented, 8 billion dollars per day, according to a Greenpeace report published in February 2020. Geographically, not surprisingly, it is the most polluting countries that suffer the greatest economic damage from pollution: China, the United States and India. In addition to the already huge cost of pollution to world governments, the cost of diseases caused by pollution, which has to be paid for by governments, is also huge - around €1.4 trillion for European countries alone every year. But that's not all - according to the United Nations Environment Programme (UNEP), losses in competitiveness and declining agricultural productivity in some parts of the world are also costing governments a lot of money. This is the case in Latin America, for example. More than 80% of its population lives in cities where air pollution is responsible for health problems and productivity losses. Although the region is responsible for only about 10% of global greenhouse gas emissions, it is very vulnerable to the effects of climate change. But this is also the case for Africa, which, because of pollution, faces serious environmental problems, including land degradation, deforestation, loss of biodiversity and extreme vulnerability to climate change.



KEY INTERNATIONAL PLAYERS

CHINA

According to the Climate Change Performance Index, China is the world's largest polluting country. Indeed, it is the country that emits the most greenhouse gases into the atmosphere with 28.2% of global CO₂ emissions. In addition, China is also the country that produces the most waste, with 8.80 million tonnes of plastic waste that is poorly managed and 3.53 million tonnes of plastic scrap that ends up in the oceans every year. Even if China is the world's biggest polluter, it is also the country that relies the most on renewable energies, particularly solar and wind power. In 2016 alone, 40% of the world's green energy production will have come from China.

USA

According to the Climate Change Performance Index, the United States is the second most polluting country in the world with 14.5% of greenhouse gas emissions. However, when it comes to waste, the United States is much less polluting with 0.30 million tonnes of plastic waste that is poorly managed and 0.11 million tonnes of plastic scrap that ends up in the oceans every year.

WWF

The World Wide Fund for Nature (WWF) is one of the leading international environmental non-governmental organisations (NGOs). WWF's main idea is summed up in its slogan: "Building a future in which people live in harmony with nature". On its website, it is explained that it works on a variety of themes, with a focus on seven environmental issues: wildlife, forests, oceans, access to drinking water, climate and energy, food and biodiversity.

IPCC

The Intergovernmental Panel on Climate Change (IPCC) is the main international body responsible for assessing climate change. As indicated on the IPCC website, it was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a clear scientific view of the current state of knowledge on climate change.

CHRONOLOGY**18/12/2018****Speech by Greta Thunberg at COP24**

Greta Thunberg, a young Swedish activist, used a platform at COP 24 to shake up world leaders. For the activist, now is the time to act. "We've come to tell you that it's time for change, whether you like it or not. »

15/03/2019**Student riots for the environment**

On 15 March 2019, more than 2 million young people around the world responded to Greta Thunberg's international call for action. All over the world, high school and university students came out of their Friday classes and went to demonstrate to raise awareness and sensitise the greatest number of people, as well as to denounce the inaction of political leaders.

23/09/2019**Summit on Climate Emergency in New York**

On 23 September 2019, an exceptional Summit dedicated to the climate emergency was organised at the United Nations headquarters in New York. The young Swede Greta Thunberg was invited, and in a furious speech she rebuked world leaders for their inaction on climate change. "I shouldn't be here, I should be at school, on the other side of the ocean," she said. "How dare you? You have stolen my dreams and my childhood with your empty words. »

RELEVANT UNITED NATIONS TREATIES AND EVENTS

09/05/1992

United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC was adopted at the Earth Summit in Rio de Janeiro in 1992 by 154 States. It entered into force on 21 March 1994. In 2004 it was ratified by 189 countries, in 2015 there are 195 countries and in 2018 197 countries. The UNFCCC is the first attempt, within the framework of the UN, to better understand what climate change is and how to address it.

09/2015

17 Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a universal call to action to eradicate poverty, protect the planet and improve the daily lives of people everywhere, while opening up opportunities for the future. There are 17 sustainable development goals, adopted in 2015 by all United Nations Member States under the Sustainable Development 2030 Programme, which sets out a 15-year plan to achieve these goals.



11-12/2015

Cop21

On 12 December 2015, the COP21 concluded on a first agreement which foresees to limit the temperature increase to 2°, or even to go towards the objective of 1.5° compared to the pre-industrial era. It also plans to reduce greenhouse gas consumption by 45% by 2030 and by 100% by 2050 compared to 2010 levels.

04/11/2016

Paris agreements

On 4 November 2016, just one year after COP21, the Paris Agreement entered into force. It aims to strengthen the capacity of countries to cope with the consequences of climate change and to support them in their efforts to limit climate change, reduce pollution and preserve the environment. In addition, it also revisits some of the objectives decided at COP21. This is a historic agreement for international climate negotiations.

23/09/2019

Summit on Climate Emergency in New York

As part of the 74th session of the United Nations General Assembly on 23 and 24 September in New York, the UN Secretary General, António Guterres, invited world leaders to the Climate Action Summit on 23 September 2019. An exceptional summit dedicated to the climate emergency. Objective: to support efforts to implement the Paris Agreement and strengthen climate action, including by governments, finance, business and civil society.

POSSIBLE SOLUTIONS

By bringing air concentrations down to the 2005 WHO target levels of 20 µg/m³ (micrograms per cubic metre) instead of the current 70 µg/m³, according to the WHO, it would be possible to reduce mortality from air pollution by 15%. Achieving lower levels of air pollution would also reduce respiratory and cardiovascular diseases and increase the life expectancy of local populations. In addition, measures to reduce air pollution in urban areas will also reduce emissions of greenhouse gases and other pollutants contributing to climate change.

The most polluting cities can identify their main sources of air pollution and implement policies that are known to improve air quality, for example: promoting public transport, walking and cycling; promoting energy plants using clean and renewable fuels (no coal for solar or wind power); and improving the energy efficiency of buildings and industry. In addition, effective monitoring to assess and publicise the impact of interventions is also important as a means of awareness-raising and regulation. It can help direct policy action that can benefit health, climate and the environment. Laws should also be put in place to set limits on the use of pesticides in agriculture, greenhouse gases in all sectors of the economy, and deforestation, in order to preserve forests and their fertile soils.

In addition to reducing their greenhouse gas emissions, countries could capture CO₂ from the atmosphere, for example by planting forests, promoting sustainable agriculture and sustainable forestry, in order to meet the reduction targets. They could also find effective ways to manage their waste, drawing inspiration from countries such as Sweden. Only 1% of Swedish household waste ends up in landfills, compared with 38% for the average European country. In detail, 36 percent of this waste is recycled, 14 per cent composted and, above all, 49 per cent incinerated, although a better alternative to incineration should be found because it is extremely polluting due to the very high quantities of hydrogen chloride it emits, a colourless, toxic and highly corrosive gas. Countries must therefore agree, innovate and find solutions to manage polluting wastes such as chemicals or plastics.

Also, international agreements, such as the Paris Agreements, should be reached, but they should be more effective, because although they were ratified by the majority of the countries present at COP21, they were not always respected. The latest example is the withdrawal of the United States from these agreements in November 2019. Agreements should therefore be reached that the ratifying countries are better able to comply with.

On the scale of the international community, the exchange of data on pollution levels is essential for moderating and managing these problems as well as the requirement for commitments to reduce pollution.

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