Climate change

Address from the World Federation of Scientific Workers (WFSW)

To International Scientific Organisations
To UN Organisations
To International NGOs

Beijing, 17 August 2024

The World Federation of Scientific Workers, meeting in Beijing for its 96th Executive Council from 11 to 17 August 2024, is calling on the world community to take the full measure of the urgency of climate change and to amplify global mobilisation.

An increasing level in international agreements and objectives

At COP15 in Copenhagen in 2009, the nations of the world committed to "hold the increase in global temperature below 2 degrees Celsius, "[1].

COP21, in Paris in 2015, reinforced this objective, "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels"[2].

COP26, in Glasgow in 2021, translated the objective of not exceeding a warming of 1.5°C by the end of the 21st century compared with pre-industrial levels into two global targets for reducing anthropogenic Greenhouse Gas (GHG) emissions: reducing global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and reaching net zero around mid-century[3].

1 https://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=4
2 https://unfccc.int/sites/default/files/english_paris_agreement.pdf
3 https://unfccc.int/sites/default/files/resource/cma2021_10_add1_adv.pdf

COP28, in Dubai in 2023, updated and strengthened these GHG emissions reduction targets, again with the aim of not exceeding a warming of 1.5°C by the end of the 21st century compared with pre-industrial levels: a 43% reduction in anthropogenic GHG emissions between 2019 and 2030, then 60% between 2019 and 2035; reaching net zero CO_2 emissions by 2050[4].

The WFSW notes the historic dimension of these four major milestones achieved in Copenhagen, Paris, Glasgow and Dubai. Never before in history all nations have set common objectives whose the achievement requires mobilisation and transformations on such a scale, not only in economic, social, scientific and technical terms, but also in terms of civilisation.

Mobilisation should fall short of objectives and a denial of responsibilities

Climate modelling has established that the climate has moved out of its natural variations since the end of the 20th century, due to warming caused by anthropogenic GHG emissions.

In 2013, the General Assembly of the 197 IPCC member states unequivocally recognised the existence of anthropogenic global warming[5].

For just over a decade, with a view to slowing CO_2 emissions growth and then reducing these emissions, national and international initiatives have been gathering momentum. The development of renewable energies is accelerating. As a result, renewable energies now represent a major economic challenge that is reflected in geopolitical tensions. This is particularly the case in the solar panel and electric car sectors, where China has taken the lead thanks to a research/development/industrialisation strategy that has proved to be a powerful accelerator of the energy transition in China and far beyond.

CO_2 emissions look set to peak soon[6]. However, this is only the very first stage in the necessary mobilisation. A very rapid reduction in GHG emissions is now essential if we are to achieve the Dubai targets, which include a reduction of just over 43% between now and 2030. If there is to be any hope of achieving these targets, each nation must do its part, while recognising that the diversity of national GHG emission levels and historical trajectories must be taken into account.

The European Union (EU) has pledged to "reduce net GHG emissions by at least 55% by 2030 compared to 1990 levels"[7]. However, since its net emissions fell by 28%[8] between 1990 and 2019, therefore a reduction of at least 55% between 1990 and 2030 is equivalent to a reduction of at least 38% between 2019 and 2030. Finally, the EU's actual commitment, 38%, is lower than that made by the nations together, 43%. This is despite the fact that the EU's level of emissions per capita is well above the global average, and that the EU's historical trajectory of emissions per capita is disproportionately higher than the global trajectory. The reduction in European GHG emissions between 1990 and 2019 only very partially corrected the gap between Europe and the rest of the world: this in no way justifies a lower EU contribution to the global effort between 2019 and 2030.

On the other side of the Atlantic, between 1990 and 2019, the United States did not reduce its GHG emissions. Its CO_2 emissions (excluding Land Use, Land Use Change and Forestry (LULUCF))

4 Https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf?download=
5 5th AR, SPM, D., p.15.
6 https://essd.copernicus.org/articles/15/5301/2023/
7 https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_fr
8 https://www.statistiques.developpement-durable.gouv.fr/edition-numerique/chiffres-cles-du-climat-2022/8-panorama-europeen-des-gaz-a

increased by 0.8% over this thirty-year period, while the EU reduced its emissions by 23.1%[9]. However, this divergence between the US and the EU is matched by a divergence in demographic trends, so that between 1990 and 2019 per capita CO_2 emissions excluding LULUCF fell by 23.3% in the US, close to the EU level of 27.7%[10].

However, the comparison between the EU and the US must also take into account the difference in the quantity of GHGs emitted per capita, and not just the speed of reduction. In 2019, CO_2 emissions per capita in the United States (excluding LULUCF) were more than double those of the EU, see table below.

CO_2 emissions per capita (excluding LULUCF) in 2019, COP28 reference year in tCO_2

Area	
United-States	15,6
Russia	12,4
China	8,3
EU	6,6
Meadle-East & North-Africa	6
South and Central America	2,5
India	1,9
Sub-Saharan Africa	0,8
World	5

Table of emissions for an area divided by the population, without taking into account emissions induced by consumption. Source[11].

A correction to the data in the table above consists of taking into account the emissions generated by the consumption of imported products. The emissions of the EU and the United States are then greatly increased and those of China, which produces massively for the consumption of Western countries, greatly reduced and finally clearly lower than those of the EU.

A proportional translation of the first Dubai target to CO2 only, excluding LULUCF, requires global emissions per capita to be reduced to 2.85tCO2 in 2030. The second target requires a reduction to 2tCO2 in 2035. The table above shows that if the human community is to achieve the Dubai objectives, the populations and territories that emit the most emissions will need to make substantial and urgent changes, including in civilisational terms, including a culture of sobriety, a concept introduced in the IPCC's 6th Assessment Report (AR).

There is also an urgent need of adaptation to climate change, in the face of change that is already occurring and, by anticipation, in the face of future change. The countries of the inter-tropical zone and, more broadly, of the zone between the 30th parallels are, with some exceptions, neither historically responsible for global warming nor currently responsible, as the table above illustrates. However, these countries will suffer the main damage from global warming. It is up to the countries primarily responsible for this situation to make the financial and technological transfers needed to help the

9 https://www.statistiques.developpement-durable.gouv.fr/edition-numerique/chiffres-cles-du-climat-2022/6-emissions-de-co2-hors-utcatf

10 https://www.statistiques.developpement-durable.gouv.fr/edition-numerique/chiffres-cles-du-climat-2022/6-emissions-de-co2-hors-utcatf

11 https://www.statistiques.developpement-durable.gouv.fr/edition-numerique/chiffres-cles-du-climat-2022/pdf/chiffres-cles-du-climat-2022-integral.pdf . P.34.

adaptation of the countries of the inter-tropical zone. With this in mind, there is an urgent need to put in place a global solidarity plan to mitigate climate change and adapt all regions to this change.

Objectives that overlook risks

The Dubai objectives are a political translation, by COP28, of a climate scenario for the 21st century published in 2021 in the IPCC WG1 contribution to the 6th AR[12]. This is the 1-1.9 emission scenario, for which the projected rise in average global surface temperature in 2100 would be, with a 90% probability, between 1°C and 1.8°C compared with 1850-1900. This scenario takes place between 2015 and 2100 and, about CO_2 emissions, is based on the Dubai targets. Compared with 2019, it shows a reduction in net anthropogenic CO2 emissions of 43% in 2030, and 60% in 2035. It then moves on to neutrality in 2050. A number of observations can be made. We will make three of them here.

1. The confidence interval of 1-1.8° Celsius with a 90% probability does not guarantee that the objective of limiting global warming to 1.5°C will be met, contrary to what is stated in the Dubai declaration.

2. The Summary for Policy Makers (SPM) of WG1's contribution to the 6th AR warns of two facts:
- « *Additional ecosystem responses to warming not yet fully included in climate models, such as CO 2 and CH 4 fluxes from wetlands, permafrost thaw and wildfires, would further increase concentrations of these gases in the atmosphere.* »[13].
- « *Low-likelihood outcomes, such as ice sheet collapse, abrupt ocean circulation changes, some compound extreme events and warming substantially larger than the assessed very likely range of future warming (*i.e. the upper limit of the confidence interval for a scenario*) cannot be ruled out and are part of risk assessment.* »[14].

3. Some scientifically identified phenomena are excluded from climate models, although the hypothesis that they would further increase GHG concentrations in the atmosphere cannot be ruled out. We would like to draw attention to three of them: the melting of polar glaciers and, beneath them, the development of populations of single-celled organisms that emit methane (CH_4) and carbon dioxide (CO_2); the disintegration of methane hydrates on the seabed; and changes in marine life. Each of these three phenomena is likely to release methane and carbon dioxide into the atmosphere. It cannot be ruled out that they will do so in significant quantities (Delepouve, 2023). One of the characteristics they have in common is that they are highly unpredictable and, correlatively, there is no way of quantifying the associated GHG emissions during the 21st century.

Changes in marine life require particular attention. For more than 3.5 billion years, the history of the Earth system and its climate has been strongly interdependent with that of marine life, its balances, ruptures and unprecedented emergences (Ramstein, 2015). The role of marine life is a determinant of the composition of the atmosphere (greenhouse gases, oxygen, etc.) and, correlatively, a determinant of the Earth's climate and of life on the continents. However, marine life is subject to major anthropogenic

12 Report of WG1, RID, p.14, fig. RID.4, panel a).
13 Section B.4.3., page 26.
14 Section C.3, page 27.

disturbances (global warming and water acidification, overfishing and pollution). As a result, the environment of marine life is unprecedented. It is entering an unknown zone. Its evolution between now and the end of the 21st century is largely unpredictable (Tagliabue et al., 2011; Bopp et al., 2013; Delepouve, 2023, p.256-263).

Which strategy? What mobilisation?

The historic approval of GHG reduction targets by the climate COPs in Glasgow and Dubai is therefore only a first step, which does not rule out the risk of a rise in average global surface temperature well in excess of 1.5°C, or of global warming spiralling out of control. Above and beyond these quantified targets, the nature, scale and urgency of the climate and ecological catastrophe that collectively threatens the human community requires a high level of global mobilisation and solidarity towards Ecological Civilisation, an objective enshrined in the Constitution of the People's Republic of China in 2018. In order to mitigate climate change and greatly reduce the risk of runaway warming, in order to adapt to climate change, but also and inseparably in order to save the oceans, soils, fresh water, air quality, biodiversity and the major global bio-chemical balances, the WFSW calls for :

1. To step up scientific monitoring and research into phenomena that pose risks to the climate or the habitability of the Earth system: disturbances to marine life, melting polar ice caps, thawing permafrost, mega forest fires, disruption of the planet's major bio-chemical balances, etc. Apply precautionary policies to each of these phenomena.

2. Implement a climate change mitigation and adaptation strategy that takes account of all causal phenomena, i.e. those that are expected to or may influence the future of the climate, including phenomena that are unpredictable. Continuously adjust this strategy to actual evolution in climate change, its causal phenomena and scientific knowledge about this change and these phenomena.

3. Implement a global solidarity plan to mitigate climate change and adapt to it for all the world's territories and populations, especially those located between latitudes 30°N and 30°S. Make the necessary financial and technological transfers.

4. To set up a Global Research Fund with the mission of developing research in all territories in order to support mitigation and adaptation policies everywhere that are as close as possible to economic, social, cultural, geographical, ecological and climatic realities, and so that all populations and the richness of their diversity participate in the development of global research into the climate and the habitability of the Earth system. Policies to mitigate global warming include, while respecting the precautionary principle, policies to reduce GHG sources and to protect and develop sinks.

5. Set up regional sovereign research funds, partly financed by the Global Fund, in particular an African Fund, which share the same mission as the Global Fund.

6. Informing the public of all the scientific knowledge relating to climate change. As a result, any communication of climate scenarios such as those published by the IPCC should be accompanied by the associated Causal Remainder, i.e. all the phenomena that should or could influence the global climate but which are not taken into account or are only partially taken into account by these scenarios.

7. Ratify and implement the International Treaty on the Conservation and Sustainable Use of Marine Biological diversity in the High Seas[15] adopted at the UN Conference on Marine Biodiversity on 4 March 2023.

8. Implement strong policies - financial, regulatory, penal – in favour of sobriety among the populations that emit the most greenhouse gases and, more broadly, to accelerate the reduction of greenhouse gas emissions and all forms of pollution of the Earth system.

9. Implement a global plan to rapidly reduce anthropogenic methane emissions.

10. Set up an international tribunal dedicated to crimes against the climate and the global environment.

11. Put an end to armed conflicts. These conflicts contribute directly to the degradation of the climate and the habitability of the Earth system, and distract populations and States from the necessary global mobilisation and solidarity.

12. Apply the Recommendation on Open Science adopted by UNESCO on 23 November 2021.

Anticipating the risk of an overheating episode

The two main greenhouse gases emitted into the Earth's atmosphere by human activity are CO_2 and CH_4. The weight of the latter in the current greenhouse effect surplus, i.e. the difference between the current greenhouse effect and the greenhouse effect of the pre-industrial period[16], is around 55% of the weight of CO_2[17]. What's more, the effects of reducing emissions are around ten times faster for CH_4 than for CO_2, due to the difference in atmospheric lifetime. Consequently, in the face of a climate emergency, action on CH_4 is far more effective than action on CO_2.

Alongside anthropogenic GHG emissions that are warming the climate, there are anthropogenic $S0_2$ emissions, more than 75% of which are associated with fossil fuels[18] and whose albedo effect attenuates global warming. In addition, SO_2 generates sulphate aerosols, which also have an albedo effect. Also, these aerosols act on the cloud system and reduce its radiation balance. So SO_2 emissions have a cooling effect on three levels. As a result, the energy transition away from fossil fuels is likely to result in an episode of climate overheating. .

In its 5th AR, the IPCC warned on the subject: "*If rapid reductions in sulphate aerosol are undertaken for improving air quality or as part of decreasing fossil-fuel CO2 emissions, then there is medium confidence that this could lead to rapid near-term warming. There is evidence that accompanying controls on CH4 emissions would offset some of this sulphate-induced warming, although the cooling from CH4 mitigation will emerge more slowly than the warming from sulphate mitigation due to the different time scales over which atmospheric concentrations of these substances decrease in response to decreases in emissions.*"[19].

15 https://treaties.un.org/doc/Treaties/2023/06/20230620%2004-28%20PM/Ch_XXI_10.pdf
16 By the pre-industrial period we mean the period 1850-1900, which is the reference used by the IPCC to measure global warming.
17 According to IPCC, 5th AR, WG1, SPM, C., p.13.
18 https://fr.wikipedia.org/wiki/Dioxyde_de_soufre, seen on 22 May 2024.
19 Extract from the TS of WG1's contribution to the 5th AR. Section 5.2, p. 81.

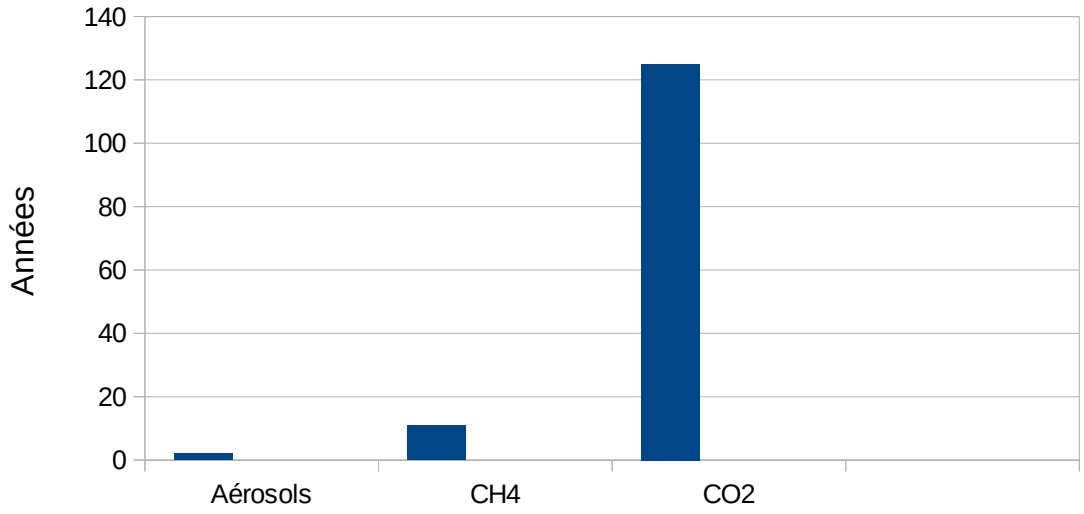

Figure: median lifetime of the two main greenhouse gases and aerosols

According to the IPCC's 6th AR, aerosols resulting from anthropogenic SO_2 emissions (more than 75% of which come from fossil fuels) have a cooling effect within the confidence interval 0.15°C - 0.9°C[20] with a 90% probability. The median lifetime of aerosols is less than two weeks in the troposphere and two years in the stratosphere[21], while that of CO2 is around 125 years. This means that the overheating caused by the transition to the end of fossil fuels could exceed 0.5°C, or even 0.7°C. This is a vital issue. An overheating episode of more than 0.5°C, and even more than 0.7°C, runs the risk of triggering positive (amplifying) climate feedback loops - as we are reminded by the scale of the forest fires in the Amazon and Siberia in 2024, following those in Canada in 2013 - and thus of triggering a runaway increase in global warming.

Given the uncertainties, the seriousness and the irreversible aspects of the risk of global warming spiralling out of control as a result of an overheating episode, the precautionary principle is essential. Consequently, given the median lifetime of CH4 in the atmosphere of around a decade, and given the weight of this gas in the anthropogenic greenhouse effect, a reduction in anthropogenic CH4 emissions, anticipating and outstripping the reduction in the use of fossil fuels, without weakening the ambitions of the latter, is an absolute necessity.

The WFSW is calling for a global plan to rapidly reduce anthropogenic methane emissions. Agriculture and the exploitation of fossil fuels are the two main sectors of human activity that emit methane. Techniques exist to significantly reduce emissions in these two sectors. Some are already available for large-scale use. Others need to be perfected. Still others are only at the stage of theoretical knowledge and laboratory experimentation. On these issues, the WFSW is calling for research to be stepped up as quickly as possible and for international scientific cooperation to be developed.

20 6th AR, GT1, SPM, p.7, Panel (c).

21 According to:
https://www.climat-en-questions.fr/reponse/aerosols-et-climat-par-olivier-boucher/ . Seen on 31 May 2024.
https://www.cea.fr/comprendre/Pages/climat-environnement/complements-climat/aerosols.aspx. Seen on 29 July 2024

Treaty on the High Seas

The WFSW calls for ratification of the *International Treaty on the Conservation and Sustainable Use of Marine Biodiversity in the High Seas*. Adopted after 20 years of negotiations at UN headquarters on 4 March 2023 by the *Intergovernmental Conference on Marine Biodiversity beyond Areas of National Jurisdiction*, this legally binding treaty will enter into force 120 days after ratification or adoption by 60 countries.

It includes important clauses such as

- an approach that enhances the resilience of ecosystems, in particular to the adverse effects of climate change and ocean acidification, and also preserves and restores the integrity of ecosystems, including the carbon cycle services that underpin the ocean's role in climate;

- the fight against pollution and plastic waste;

- the precautionary principle or precautionary approach;

- the use of the best available scientific knowledge and information;

- freedom of marine scientific research;

- the fair and equitable sharing of benefits and discoveries;

- recognition of the knowledge and rights of indigenous peoples.

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