**IPCC 2021 Report**

**Introduction**

The [Intergovernmental Panel on Climate Change](https://www.ipcc.ch/) (IPCC), the UN body for the assessment of science related to climate change, released its latest report on August 9, 2021. Totaling nearly 3,000 pages, "[Climate Change 2021: the Physical Science Basis](https://www.ipcc.ch/report/ar6/wg1/?__cf_chl_jschl_tk__=pmd_f836eb054b4111edcdd662c33f604fbf90778703-1628503610-0-gqNtZGzNAeKjcnBszQhO)" is part of the [6th IPCC assessment cycle of climate change](https://www.ipcc.ch/site/assets/uploads/2021/06/Fact_sheet_AR6.pdf). It is the first major international assessment of climate change research since 2014, and includes a three-year analysis of 14,000 peer-reviewed scientific studies carried out collectively by 234 authors and approved by 195 governments.

**Outcomes**

The report confirms previous assessments by IPCC but also includes some new elements, such as:

* A more accurate projection on global warming as a result of improved datasets, recent progress in climate science and more detailed regional research assessments.
* A focus on the reduction of all greenhouse gases, not just CO2.

Applying five greenhouse gas emissions scenarios, the report estimates that global warming will reach 1.50C above preindustrial levels by 2040. This is earlier than 2050 which was suggested by an [IPCC report only three years ago](https://unfccc.int/topics/science/workstreams/cooperation-with-the-ipcc/ipcc-special-report-on-global-warming-of-15-degc#eq-4).

The key takeaway is that **immediate, rapid and large-scale reductions in all greenhouse gas emissions are required to prevent global warming from exceeding 1.5°C – 2.00C during the 21st century, as noted in the Paris Agreement**.

**Implications for the dairy sector**

IPCC reports usually have a considerable impact on the negotiations of the [United Nations Framework Convention on Climate Change](https://unfccc.int/) (UNFCCC). This one is expected to pressure governments to commit to a significant reduction of greenhouse gases at the [UNFCCC COP26](https://ukcop26.org/) meeting in Glasgow this November.

While the report focuses primarily on reducing CO2, it also highlights the need to reduce other non CO2 greenhouse gas emissions. **Strong, rapid, and sustained reductions in methane (CH4) emissions are suggested, for example.** This comes on the heels of the [Global Methane Assessment](https://www.ccacoalition.org/en/resources/global-methane-assessment-full-report) conducted by the [Climate and Clean Air Coalition](https://www.ccacoalition.org/en) and the [United Nations Environment Programme](https://www.unep.org/). Released earlier this year, that assessment said decreasing methane emissions would reduce global warming and prevent premature deaths, among other benefits.

The IPCC report specifically references methane as a critical GHG in the mitigation process, but it also invests considerable time acknowledging the behaviour of short-lived climate pollutants (SLCP). The role of different climate metrics (including GWP\*) are discussed, along with how they can be applied in both planning and quantifying emissions. GDP and partners recently published a [literature review](https://www.globaldairyplatform.com/news-posts/current-metrics-may-not-reflect-methanes-true-climate-impact/) on GWP\* and modeling exercises are underway. Importantly, the report references Net Zero greenhouse gas emissions, going beyond Net Zero carbon, to account for both short- and long-lived climate pollutants. This is helpful to dairy as it recognizes that greenhouse gases are not all the same.

This report will result in greater scrutiny of the livestock sector by both governments and stakeholders, who will be looking for concrete actions and progress on emissions reduction. And the specific recommendations on the role of methane emissions are likely to provide further grounds to challenge the livestock sector.

**Next steps**

* The dairy sector should continue to review the report and its subsequent amendments (the report is subject to change).
* It is clear that now, more than ever, there is a great need to advance the [Pathways to Dairy Net Zero](https://www.globaldairyplatform.com/pathwaystodairynetzero/) initiative and measure progress via the [Dairy Sustainability Framework](https://dairysustainabilityframework.org/).
* The sector must further invest in knowledge building and the application of climate metrics in agriculture scenarios.
* The sector can use the report to explore and better understand the concept of Net Zero Greenhouse Gas Emissions and how this can be applied to dairy systems.

**Annex**

*Next three reports:*

* AR6 Synthesis Report: Climate Change - 2022 (*Due September*)
* AR6 Climate Change 2022: Mitigation of Climate Change (*Due March*)
* AR6 Climate Change 2022: Impacts, adaptation and Vulnerability (*Due February*)

*Extract from the report*

*D1 From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO2 emissions, reaching at least net zero CO2 emissions, along with strong reductions in other greenhouse gas emissions. Strong, rapid and sustained reductions in CH4 emissions would also limit the warming effect resulting from declining aerosol pollution and would improve air quality.* [page 36]

D.1.7 In the five illustrative scenarios, simultaneous changes in CH4, aerosol and ozone precursor emissions, that also contribute to air pollution, lead to a net global surface warming in the near and long-term (high confidence). In the long term, this net warming is lower in scenarios assuming air pollution controls combined with strong and sustained CH4 emission reductions (high confidence). In the low and very low GHG emissions scenarios, assumed reductions in anthropogenic aerosol emissions lead to a net warming, while reductions in CH4 and other ozone precursor emissions lead to a net cooling. Because of the short lifetime of both CH4 and aerosols, these climate effects partially counterbalance each other and reductions in CH4 emissions also contribute to improved air quality by reducing global surface ozone (high confidence).[page 39]

SLCP – Or basically sections 7-122 to 7-127

Since AR5 there have been developments in how to account for the different behaviours of short-lived and long-lived compounds. Pulse-based emission metrics for short-lived greenhouse gases with lifetimes less than twenty years are very sensitive to the choice of time horizon (e.g. Pierrehumbert, 2014). Global surface temperature changes following a pulse of CO2 emissions are roughly constant in time (the principle behind TCRE, Figure 7.21b, Chapter 5, Section 5.5.1) whereas the temperature change following a pulse of short lived greenhouse gas emission declines with time. (P1736)

For a stable global warming from non-CO2 climate agents (gas or aerosol) their effective radiative forcing needs to gradually decrease (Tanaka and O’Neill, 2018). Cain et al. (2019) find this decrease to be around 0.3% yr-1 (P 1737)

By comparison expressing methane emissions as CO2 equivalent emissions using GWP-100 overstates the effect of constant methane emissions on global surface temperature by a factor of 3-4 over a 20-year time horizon (Lynch et al., 2020, their Figure 5), while understating the effect of any new methane emission source by a factor of 4-5 over the 20 years following the introduction of the new source (Lynch et al., 2020, their Figure 4). (P 1737)

In summary, new emission metric approaches such as GWP\* and CGTP are designed to relate emission changes in short-lived greenhouse gases to emissions of CO2 as they better account for the different physical behaviours of short and long-lived gases. Through scaling the corresponding cumulative CO2 equivalent emissions by the TCRE, the GSAT response from emissions over time of an aggregated set of gases can be estimated. Using either these new approaches, or treating short and long-lived GHG emission pathways separately, can improve the quantification of the contribution of emissions to global warming within a cumulative emission framework, compared to approaches that aggregate emissions of GHGs using standard CO2 equivalent emission metrics. As discussed in Box 7.3, there is high confidence that multi-gas emission pathways with the same time dependence of aggregated CO2 equivalent emissions estimated from standard approaches, such as weighting emissions by their GWP-100 values, rarely lead to the same estimated temperature outcomes.(P1738)

The degree of ambiguity varies with the emissions scenario. For mitigation pathways that limit warming to 2°C with an even chance, the ambiguity arising from using GWP-100 as sole constraint on emissions of a mix of greenhouse gases (without considering their economic implications or feasibility) could be as much as 0.17°C, which represents about one fifth of the remaining global warming in those pathways (Denison et al., 2019).

Although there is significant history of using single-basket approaches, supported by emission metrics suchas GWP-100, in climate policies such as the Kyoto Protocol, multi-basket approaches also have many precedents in environmental management, including the Montreal Protocol (Daniel et al., 2012). Further assessment of the performance of physical and economics-based metrics in the context of climate change mitigation is provided in the contribution of Working Group III to the AR6. (P1740)

In AR6 net zero greenhouse gas emissions is defined as the condition in which metric-weighted anthropogenic GHG emissions are balanced by metric-weighted anthropogenic GHG removals over a specified period (see Chapter 1, Box 1.4, Appendix VII: Glossary). The quantification of net zero GHG emissions depends on the GHG emission metric chosen to compare emissions and removals of different gases, as well as the time horizon chosen for that metric. (P 1741)

*Press coverage*

<https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/>

<https://www.theguardian.com/science/2021/aug/09/humans-have-caused-unprecedented-and-irreversible-change-to-climate-scientists-warn>

<https://www.independent.co.uk/climate-change/news/ipcc-report-2021-summary-climate-b1899189.html>

<https://www.bbc.com/news/science-environment-58130705>

<https://www.france24.com/en/live-news/20210809-no-good-news-here-key-ipcc-findings-on-climate-change>

<https://www.theguardian.com/environment/2021/aug/06/reduce-methane-or-face-climate-catastrophe-scientists-warn>