- The **top contributors to warming up to 2021** through emissions of all three gases were:
    - USA (0.28°C / 17.3% of warming induced by global emissions of all three GHGs)
    - China (0.20°C / 12.3%)
    - Russia (0.10°C / 6.1%)
    - Brazil (0.08°C / 4.9%)
    - India (0.08°C / 4.8%)
    - Indonesia, Germany, UK, Japan, Canada (each contributing 0.03-0.05°C)

- Of the three gases, **global emissions of CO2 have contributed the most to warming**. Up to 2021, warming through global CO2 emission was 1.11°C, warming through global CH4 emission was 0.41°C and warming through N2O emission was 0.08°C.

- Up to 2021, 69.1% of the total warming caused by the three gases was related to emissions of CO2 alone. This fraction varies across countries and is lowest in those with large agricultural sectors because agriculture is a significant source of CH4 and N2O emissions. Examples:
    - UK (87.6%% of warming induced by national emissions of all three GHGs)
    - USA (83.3%)
    - Russia (76.1%)
    - Indonesia (71.3%)
    - Brazil (64.7%)
    - China (64.3%)

- The top contributors to warming up to 2021 **through emissions of CO2 alone** were:
    - USA (0.23°C / 20.9% of global CO2-induced warming)
    - China (0.13°C / 11.5%)
    - Russia (0.07°C / 6.7%)
    - Brazil (0.05°C / 4.6%)
    - Germany (0.04°C / 3.7%)
    - Indonesia, India, United Kingdom, Japan (each contributing 0.03-0.04°C)

- The **top contributors to warming through net land use, land use change and forestry (LULUCF)*** were:
    - Brazil (0.06°C / 11.3% of global land use change-induced warming)
    - USA (0.06°C / 10.8%)
    - Indonesia (0.04°C / 7.1%)
    - India (0.04°C / 6.7%)
    - China (0.04°C / 6.4%)
    - Russia (0.03°C / 4.8%)
    - Canada, Australia, Argentina (each contributing a little over 0.01°C)

  **net LULUCF emissions are the balance of emissions from deforestation, agriculture, forestry and the drawdown (negative emissions) of CO2 via re/afforestation and agricultural abandonment.*

- **Half of all countries have contributed more to warming through LULUCF emissions than through fossil fuel emissions** through their emissions since 1850, including:
    - Brazil (79% of the total national contribution to warming relates to LULUCF)
    - Indonesia (70%)
    - Argentina (68%)
    - Australia (54%)

- In recent decades, **additional contributions to warming have mainly been caused by fossil emissions**, because fossil emissions have exceeded land use emissions in most countries. For example **since 1992,** when the UNFCCC was formed at the Earth Summit in Rio de Janeiro**, the *additional* warming caused by global fossil fuel emissions has been over four times**

greater than the *additional* warming caused by global land use change emissions. The dominant source of additional contributions to warming has varied by country since 1992, e.g.:

- USA: additional warming caused by fossil emissions over 100 times greater than additional warming from land use change
- China: 15 times greater
- India: 3 times greater
- UK: over 50 times greater
- Canada: 4 times greater

- *On the other hand*, in Brazil and Indonesia the additional warming caused by LULUCF emissions has outpaced the additional warming caused by fossil emissions.

These figures compare the national contributions to warming caused by historical emissions from fossil and LULUCF sources during two periods: "period A" (1850 to 1992) and "period B" (1850-2021). All three GHGs are included in the calculation.

The formation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 represented a key milestone in international climate policy.

- National contributions to warming have changed markedly during recent decades. For example the following changes occurred since 1992, when the UNFCCC was formed at the Earth Summit in Rio de Janeiro:

  - China's contribution to warming **rose** from 7.2% (considering all emissions 1850-1992) to 12.3% (considering all emissions 1850-2021)
  - India's contribution **rose** from 4.2% to 4.8%
  - Indonesia's contribution **rose** from 2.8% to 3.4%
  - Brazil's contribution **rose** from 4.4% to 4.9%
  - The contributions from the four "BASIC" countries above **rose** from 16.6% to 23%

  - USA's contribution to warming **fell** from 20.8% to 17.3%
  - Russia's contribution **fell** from 7.8% to 6.1%
  - UK's contribution **fell** from 3.5% to 2.4%
  - Germany's contribution **fell** from 3.9% to 2.9%
  - EU27's contribution **fell** from 13.0% to 10.4%

  - The contribution of the industrialised OECD countries **fell** from 46.6% to 39.8%
  - The contribution of the "Annex I countries" **fell** from 54.5% to 44.8%. [Industrialised countries that were members of the OECD in 1992, plus economies in transition].
  - The contribution of the "Annex II countries" **fell** from 40.3% to 33.8% [only the OECD members of Annex I].

  These figures compare the national contributions to warming caused by historical emissions during two periods: "period A" (1850 to 1992) and "period B" (1850-2021). All three GHGs are included in the calculation, and both fossil and LULUCF emissions.

  *A reduction in the contribution between two dates signifies that cumulative emissions increased more slowly than **other countries**. It does not indicate a reduction in the absolute value of cumulative emissions between the two periods considered. Cumulative emissions continued to increase in all countries / groups listed above.*

  The UNFCCC defines Annex I and Annex II countries as follows (LINK):

  - *Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.*
  - *Annex II Parties consist of the OECD members of Annex I, but not the EIT Parties. They are required to provide financial resources to enable developing countries to undertake emissions reduction activities under the Convention and to help them adapt to adverse effects of climate change. In addition, they have to "take all practicable steps" to promote the development and transfer of environmentally friendly technologies to EIT*

Parties and developing countries. Funding provided by Annex II Parties is channelled mostly through the Convention's financial mechanism.