



Scientists call for renewed Paris pledges to transform agriculture

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Citation for the original published paper (version of record):

Harwatt, H., Wirsenius, S. (2019). Scientists call for renewed Paris pledges to transform agriculture. The Lancet, 4

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The scientific consensus states CO₂ emissions must be limited to 420 billion tonnes and approximately 720 billion tonnes of CO₂ must be removed from the atmosphere to limit global warming to 1.5°C with 66% probability.¹ Restoring natural vegetation, such as forest, is currently the best option at scale for removing CO₂ from the atmosphere,² and must begin immediately to be effective within the required timescale of reaching net zero emissions by 2050.¹ The livestock sector, having largely displaced natural carbon sinks, continues to occupy much of the land that must be restored.³ Without such land restoration, CO₂ removal from the atmosphere relies on methods currently unproven at scale, increasing the risk of temperatures rising high enough to tip various Earth systems into unstable states. This instability could result in the loss of coral reefs and major ice sheets, and increases the uncertainty of maintaining life-supporting ecosystems.⁴

If the livestock sector were to continue with business as usual, this sector alone would account for 49% of the emissions budget for 1.5°C by 2030,⁵ requiring other sectors to reduce emissions beyond a realistic or planned level. Since the first Intergovernmental Panel on Climate Change assessment report in 1990, the production of meat, milk, and eggs increased from 758 million tonnes to 1247 million tonnes in 2017,⁶ and is projected to further increase.⁷ Continued growth of the livestock sector increases the risk of exceeding emissions budgets consistent with limiting warming to 1.5°C and 2°C, limits the removal of CO₂ from the atmosphere through restoring native vegetation, and threatens remaining natural carbon

sinks where land could be converted to livestock production.^{3,5,7}

To help reduce the risk of global temperature rising beyond 1.5°C or 2°C, we call on high-income and middle-income countries to incorporate four measures into their revised commitments to meeting the Paris Agreement, from 2020 onwards. First, declare a timeframe for peak livestock—ie, livestock production from each species would not continue to increase from this point forward. Second, within the livestock sector, identify the largest emissions sources or the largest land occupiers, or both, and set appropriate reduction targets for production. This process would be repeated sequentially, to set reduction targets for the next largest emitter or land occupier. Third, within a reconfiguration of the agriculture sector, apply a best available food strategy to diversify food production by replacing livestock with foods that simultaneously minimise environmental burdens and maximise public health benefits—mainly pulses (including beans, peas, and lentils), grains, fruits, vegetables, nuts, and seeds.^{5,8} Fourth, when grazing land is not required or is unsuitable for horticulture or arable production, adopt a natural climate solutions approach where possible, to repurpose land as a carbon sink by restoring native vegetation cover to its maximum carbon sequestration potential,² with additional benefits to biodiversity.⁹

We propose that in creating Paris-compliant agriculture sectors, high-income and middle-income countries do not outsource their livestock production to other countries, and instead reduce demand for livestock products.

Although our suggestions are not a full list of mitigation actions for the agriculture sector, they are necessary to adhere to the equity component of the Paris Agreement, and are considered part of a suite of measures that are

needed across all sectors to reduce the risk of reaching temperature levels beyond the Paris goals. We will provide further scientific evidence about these important topics during the ongoing revision of Nationally Determined Contributions to the Paris Agreement.

We declare no competing interests. Signatories speak on their own behalf, and not on behalf of their affiliated institutions. The list of signatories supporting our call can be found in appendix 2. Additional signatures from scientists and researchers are very welcome via our online portal.

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Published Online
 December 11, 2019
[https://doi.org/10.1016/S2542-5196\(19\)30245-1](https://doi.org/10.1016/S2542-5196(19)30245-1)
 For the Spanish translation see
 Online for appendix 1
 See Online for appendix 2
 For the online portal see
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