BRIEFING PAPER

THE ROLE OF THE LAND IN ACHIEVING NET ZERO

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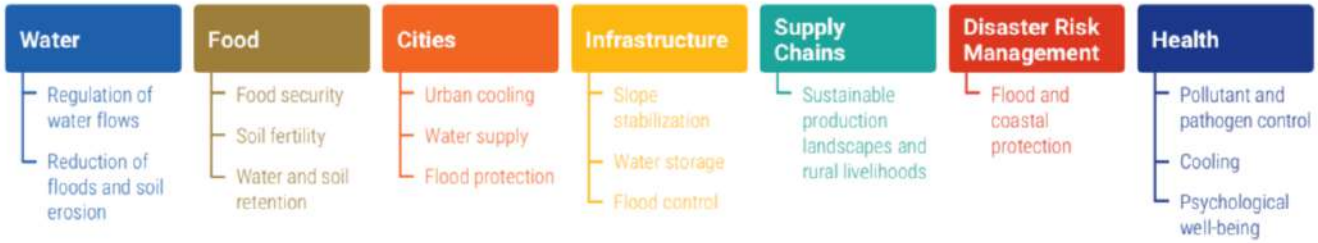
LAND WILL PLAY A VITAL ROLE IN ACHIEVING NET ZERO

About one quarter of global greenhouse gas emissions due to human activities over the past decade arose from agriculture, forestry and land-use change. At the same time, land "carbon sinks" such as trees and soil absorbed about the same amount of carbon dioxide globally. But these carbon sinks are fragile, and it is essential to avoid turning them into carbon sources. Half of land-use change emissions are from deforestation. Deforestation on any scale cannot continue if we are to achieve Net Zero.

Agriculture, land use change and peatlands accounted for 12% of the UK's greenhouse gas emissions in 2017. The Climate Change Committee recommends policies that would reduce these emissions by two thirds by 2050.

What are the value and limits to nature-based solutions (NBS) to climate change?
NBS entails working with and enhancing nature to address societal goals. NBS have the potential to tackle both climate mitigation and support human adaptation to climate change at relatively low-cost whilst delivering multiple additional benefits for people and nature. For example, restoring forests in upper catchments can help to protect communities downstream from flooding, at the same time as increasing carbon sequestration and protecting biodiversity. Planting trees and increasing green space in cities can help with urban cooling and flood abatement, while storing carbon and mitigating against air pollution and providing recreation and health benefits.

These are some examples of Nature's support in adapting to Climate Change:



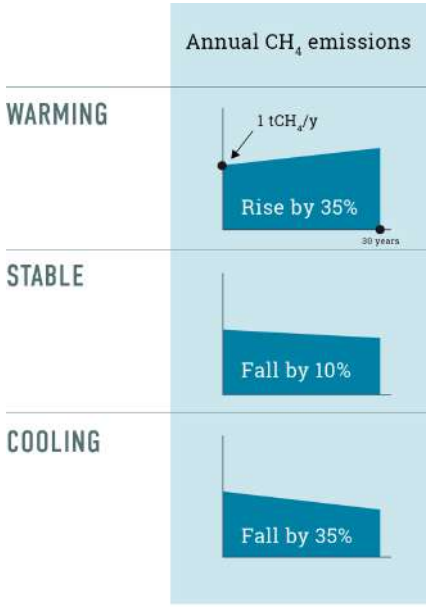
Global Comission on Adaptation Report 2019
From: gca.org/global-commission-on-adaptation/report

However, nature-based solutions should:

- Not be a substitute for fossil fuel phase-out or delay action to decarbonise our economies. Nature can help reduce peak warming by drawing down and storing carbon, but only if we also keep fossil fuels in the ground or capture and permanently store the carbon emissions. This is because nature is vulnerable to both unavoidable climate change impacts and political change.
- Involve the protection and restoration of a wide range of naturally occurring ecosystems on land and in the sea (not just woodland/forests) and sustain or enhance the diversity of species. While commercial forestry is needed, successful NbS avoids large-scale tree-planting with single, non-native species.

IMPLICATIONS OF NET ZERO TO AGRICULTURE AND FARMING

Carbon dioxide emissions must be reduced to net zero to stop global warming. In addition to carbon dioxide, agriculture generates a great deal of methane and nitrous oxide. Methane emissions must be reduced, but do not need to reach zero to stabilise global temperatures. Methane is removed by chemical reactions in the atmosphere, so that only about half of emissions will remain after a decade. Gently falling methane emissions leads to stable tempertures attributable to methane. Rapidly falling methane would cause the amount left in the atmosphere to go down, leading to near-term cooling (see figure).The widely-used concept of "CO2-equivalent emissions" fails to capture this behaviour.

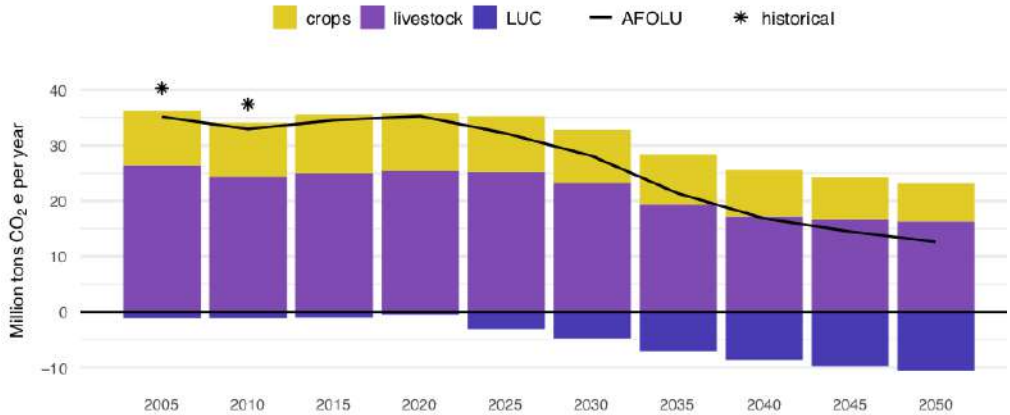


From: www.oxfordmartin.ox.ac.uk

But the more methane can be reduced, the lower the peak temperature will be. So reducing emissions from livestock is needed, but there is a debate about what is the best way to achieve this (reduced herd, efficiencies, farm management, etc.) and how to account for the benefits of these reductions. Key questions include how to compare different gases and the environmental impact of whatever replaces livestock, including the potential for offshoring of emissions or how supply chains can drive deforestation.

How are models forecasting Land Use emissions in the UK?

Modelling of future pathways that integrate shifts in diets, productivity, trade and land use amongst other factors under the 'FABLE Calculator' show that net zero emissions are still not reached in by 2050 but are reduced from 42 to 13 Mt CO2e/year. Reductions are primarily driven by significant shifts away from livestock-based foods, leading to cuts in pastureland, as well as the growth of new forests. Emissions are presented as CO2e following UK emissions accounting, but do not reflect impact on global temperature.



FABLE 2019, Pathways to Sustainable Land Use and Food System From: foodandlandusecoalition.org.
*LUC: Land Use Change. *AFOLU: Agriculture, Foresrty and Other Land Use.

RECOMMENDATIONS FOR POLICY

What can the UK do ahead of COP26?

1. Link discussions of land-use in the climate negotiations with negotiations over biodiversity taking place this year in China.
2. Provide a platform for a more precise understanding of Nature-based solutions value and limitations: nbsguidelines.info
3. Support greater understanding among climate negotiators of the different behaviour of cumulative pollutants such as carbon dioxide and short-lived pollutants such as methane and the problems inherent in the concept of 'CO2-equivalence'.
4. Lead by example: the UK's exit from the EU presents an opportunity to design new, more transparent and solutions-oriented environmental land management policies.

Some policies for the UK parliament to consider:

The Government's 25-year Environment Plan, Agriculture Bill and proposed Environment Bill (DEFRA, 2018a, 2019; House of Commons, 2018) will set the future direction of the use of land in the UK. Some policies to evaluate based on CCC recommendations:

1. Regulate on-farm emissions and promote accurate lifecycle assessment of foods using impact on global temperature rather than aggregate "CO2-equivalent" emissions.
2. Create market-based policies that mobilise capital towards nature-based solutions that promote the restoration of ecosystems.
3. Encourage low-carbon farming though public funding and support schemes.
4. Regulate food waste and encourage sustainable and healthy diets.
5. Regulate and promote innovation of supply-chain-management to avoid deforestation.