giving
nature
a home

'Agriculture's role in the EU's Paris Agreement commitments: sustainable agriculture mitigation'

John Lanchbery

Key things in treaty

“Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels …”

“Recognizing the importance of the conservation and enhancement … of sinks and reservoirs of the greenhouse gases …”

“Noting the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity …”

Agriculture …?

rspb giving nature a home

Going to 1.5°C

Will be very hard.

We have already used 2/3 of the carbon (CO_2) budget to stand a good chance (>66%) of going to 2°C.

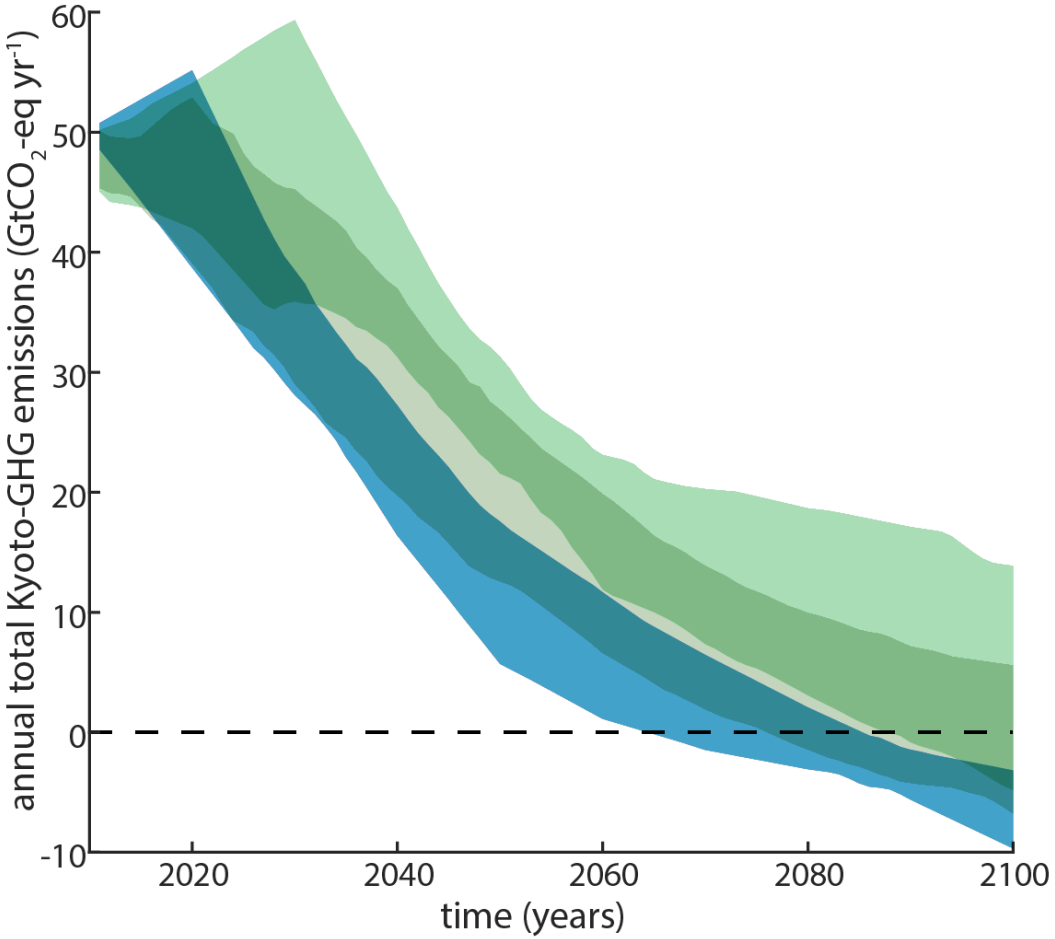
To stand a good chance of going to 1.5°C we only have about 200 Gt of CO_2 left – about 6 years worth at current emission levels.

We will need to both cut emissions hard and actively remove CO_2 from the atmosphere.

We need to be at net zero by mid-century.

rspb giving nature a home

Pathways to the 1.5°C goal



rspb giving nature a home

Where are we globally on land use?

It is only land-based vegetation and the oceans that naturally remove and store carbon dioxide from the atmosphere, roughly 50:50.

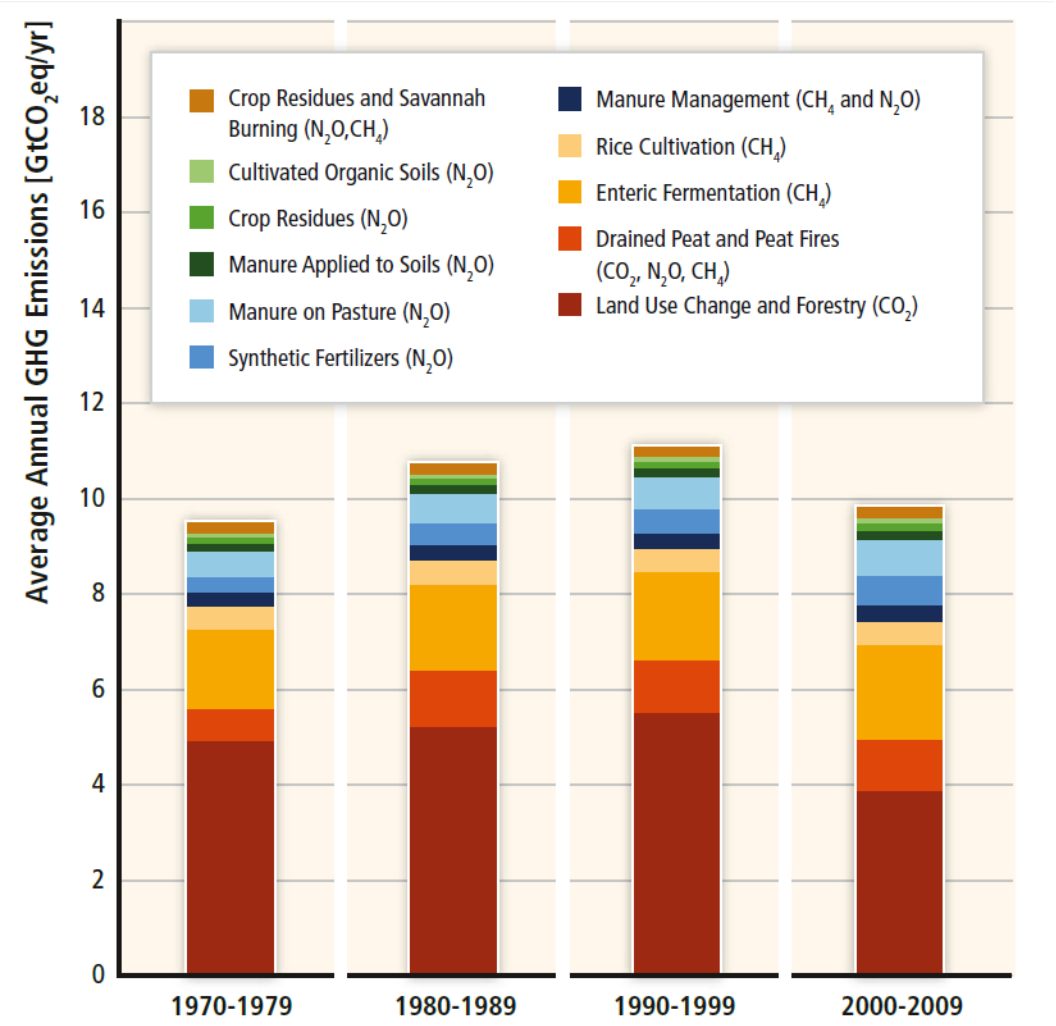
But carbon dioxide is only slowly removed from the atmosphere; about 1/2 is removed in 100 years but a 1/5th may remain after 1,000 years.

Yet deforestation, peatland degradation and other forms of land use are a large source of emissions – about 24% of all emissions (IPCC).

They need to be a large sink – soon.

rspb giving nature a home

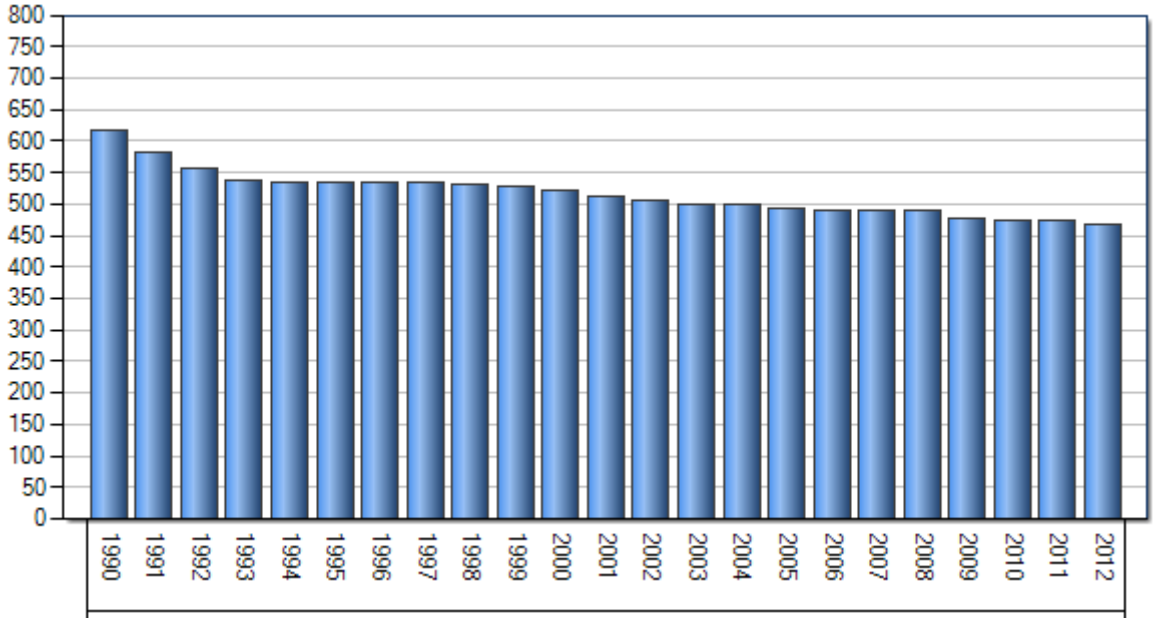
Global land use emissions



rspb giving nature a home

Where is the EU - non-CO_2?

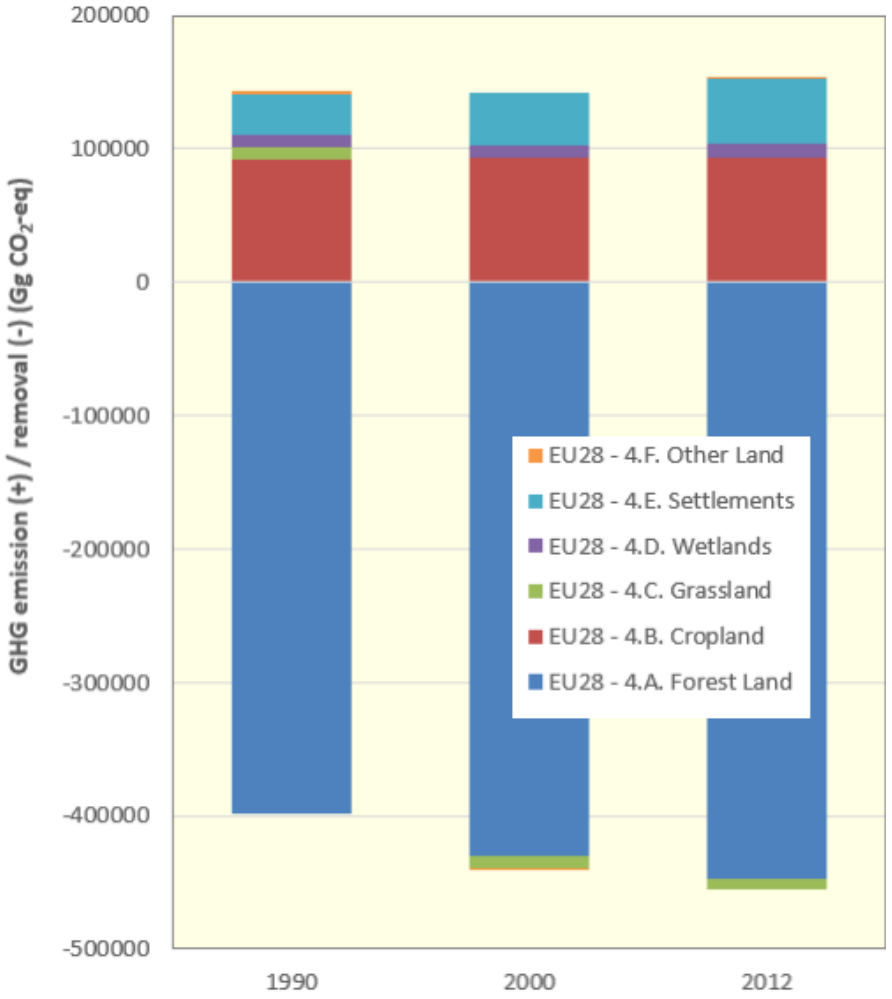
Agriculture non-CO_2 emissions (million tonnes), EEA



In 2012, 10.3% of all EU emissions, -24% from 1990. Half from soils, third from enteric (mainly cattle), balance manure management.

rspb giving nature a home

Where is the EU - CO_2 LULUCF?



Forests >400 Mt net sink

Grasslands small net sink

Cropland 100 Mt net source, especially drained peat.

Varies a lot from country to country and from year to year – especially forests.

EU submission To UNFCCC

rspb giving nature a home

Where do we need to be?

To go to 1.5^{o}C, net emissions and removals in developed countries need to be zero by 2050 and then go negative.

There is general agreement that food security is vital and some emissions from agriculture would need to continue BUT

Emissions from agriculture are large and need to be minimised to reach 1.5^{o}C.

The alternative may well be negative emission technologies (NETs) which are bad.

rspb giving nature a home

Impacts of some main NETs

Table 1: Global impacts of NETs for the average needed global C removals per year in 2100 in 2 °C-consistent scenarios (430–480 ppm scenario category; Supplementary Table 3).

NET	Global C removal (Gt Ceq yr^{-1} in 2100)	Mean (max.) land requirement (Mha in 2100)	Estimated energy requirement (EJ yr^{-1} in 2100)	Mean (max.) water requirement (km^3 yr^{-1} in 2100)	Nutrient impact (kt N yr^{-1} in 2100)	Albedo impact in 2100	Investment needs (BECCS for electricity/biofuel; US$ yr^{-1} in 2050)
BECCS	3.3	380–700	–170	720	Variable	Variable	138 billion /123 billion
DAC	3.3	Very low (unless solar PV is used for energy)	156	10–300	None	None	≫BECCS
EW*	0.2 (1.0)	2 (10)	46	0.3 (1.5)	None	None	>BECCS
AR*	1.1 (3.3)	320 (970)	Very low	370 (1,040)	2.2 (16.8)	Negative, or reduced GHG benefit where not negative	≪BECCS

PV, photovoltaic.

- The exajoule (EJ) is equal to one quintillion (10^{18}) Joules. Energy use in the United States is roughly 94 EJ per year.

From: Smith et al, Nature Climate Change, Vol 6, No 1, pp 42-50 (2015).

What can be done soon – non CO_2?

Better manure management, e.g biogas production.

Improvements in fertiliser efficiency and greater use of natural sources of fertiliser.

Increased livestock efficiency, including health improvement.

Farm carbon audits and climate advisory services to inform farmers.

What can be done soon - CO_2 Cropland and grazing land

Stop the cultivation and draining of peatlands.

Rewetting peatlands.

Cropland emission reductions by use of cover or catch crops.

Retaining crop residues in order to improve soil carbon and soil organic matter.

Stop converting grassland.

More agroforestry, where appropriate.

rspb giving nature a home

What can be done soon - CO_2 Forest land

Biodiversity sensitive afforestation, particularly in Member States with marginal agricultural land, and better constraints on deforestation.

More efficient forest management, e.g by

- enhancing forest productivity,
- improving forest protection against fire and other disturbances,
- improving soil-conserving harvesting techniques,
- making better use of the incremental growth of existing forests.

rspb giving nature a home

David Kjaer (rspb-images.com)

A view across the reedbed at Ham Wall towards Glastonbury Tor.