

An aerial photograph of a rural landscape, showing a network of winding rivers and streams that create a complex, dendritic pattern across the terrain. The land is divided into various agricultural plots and fields, some appearing as dark green or brown patches. The overall scene is a mix of natural water features and human-managed land.

Global Stock Take (GST)

Technical Dialogue

Round Table 1

13 June 2022

Nature based CDR in Long Term Strategies

TABLE 4 | References to carbon dioxide removal (CDR) methods in long-term climate strategies by country (reference to CDR is marked by an x; absence of CDR is marked by a dash). Buylova et al 2021

Type ^a	AT	CA	CR	CZ	DE	DK	EE	FI	FJ	FR	JP	KR	LV	MH ^b	MX	NL	NO	PT	SE	SG	SK	UA	UK	US	ZA	
Nature-based																										
Forest sink	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X
Soil sink	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X
Blue carbon	-	-	-	-	-	-	-	-	X	-	X	X	-	-	-	-	-	-	-	X	-	-	-	-	-	
Biochar	-	X	-	-	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HWP	X	X	-	X	X	-	X	X	X	X	X	X	X	-	X	X	-	-	X	-	X	X	X	X	-	
Technological																										
BECC(US)	-	X	-	-	-	X	-	X	-	X	X	-	-	-	-	X	X	-	X	-	-	-	X	X	-	
DACC(US)	-	-	-	-	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	
Enhanced weathering	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	
Ocean liming	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	
Bioplastics	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	

- 24 LTS**
Austria (AT)
Canada (CA)
Costa Rica (CR)
Czech Republic (CZ)
Denmark (DK)
Germany (DE)
Estonia (EE)
Finland (FI)
Fiji (FJ)
France (FR)
Japan (JP)
Korea (KR)
Latvia (LV)
Marshall Islands (MH)
Mexico (MX)
The Netherlands (NL)
Norway (NO)
Portugal (PT)
Singapore (SG)
Slovakia (SK)
Sweden (SE)
Ukraine (UA)
United Kingdom of Great Britain and Northern Ireland (UK)
United States of America, USA (US)
South Africa (ZA)

Up to today 51 LTS submissions to UNFCCC

The Nature-based options relay on the FOLU sector (FOREST and soils)

AFOLU sector

22% of total global GHG emissions (largest sector emissions some regions)

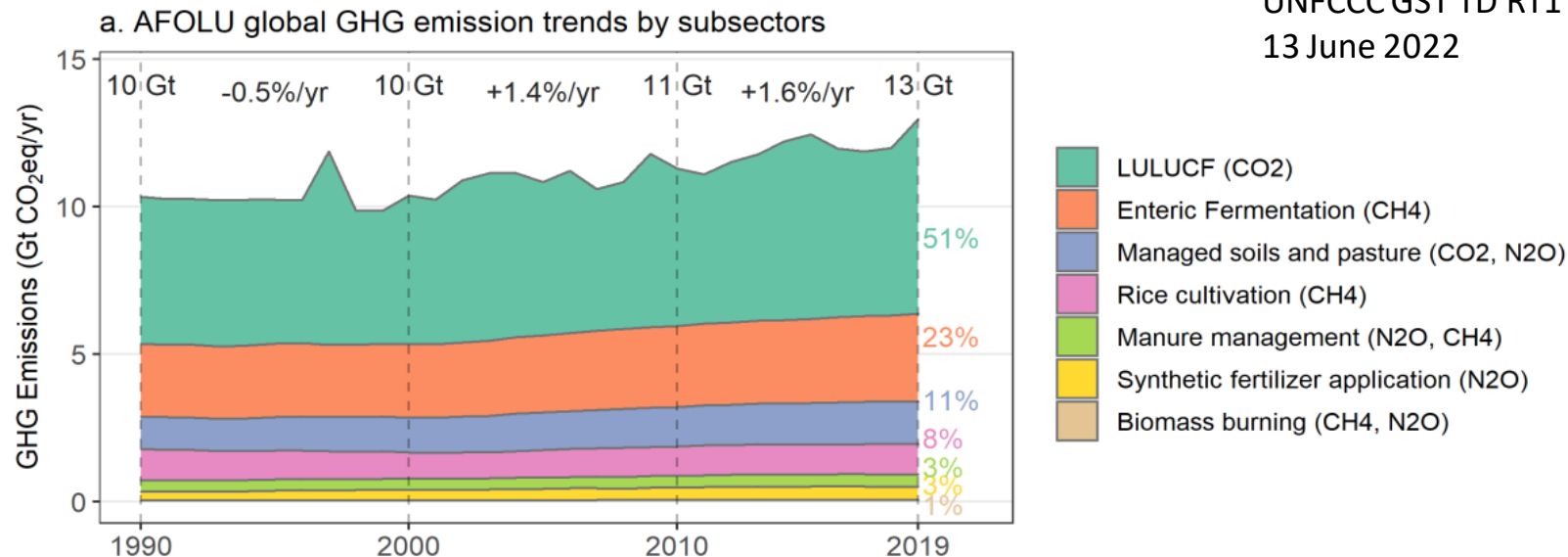
74% sector emissions (from land-use change and CH4 emissions from enteric fermentation)

Trends, particularly CO2-LULUCF, high uncertainty

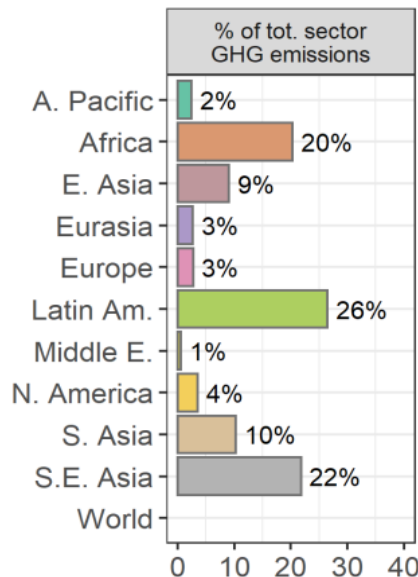
The AFOLU sector and its emissions impacts are closely tied to global supply chains

Global diets are a key driver of production per capita, and thus land pressure and AFOLU emissions

Strong links to food system



b. Emissions by region in 2019 (all GHGs, incl. LULUCF CO₂)



Significantly affected by climate change

Risk of future loss due to disturbances

Land plays an important role in climate (albedo, evapotranspiration, VOCs)

There are regional differences

WGI, II_6AR

Estimating_FOLU emissions

Currently, net CO₂ fluxes from land reported by global book-keeping models used here are estimated to be about ~5.5 GtCO₂ yr⁻¹ higher than the aggregate global net emissions based on national GHG inventories.

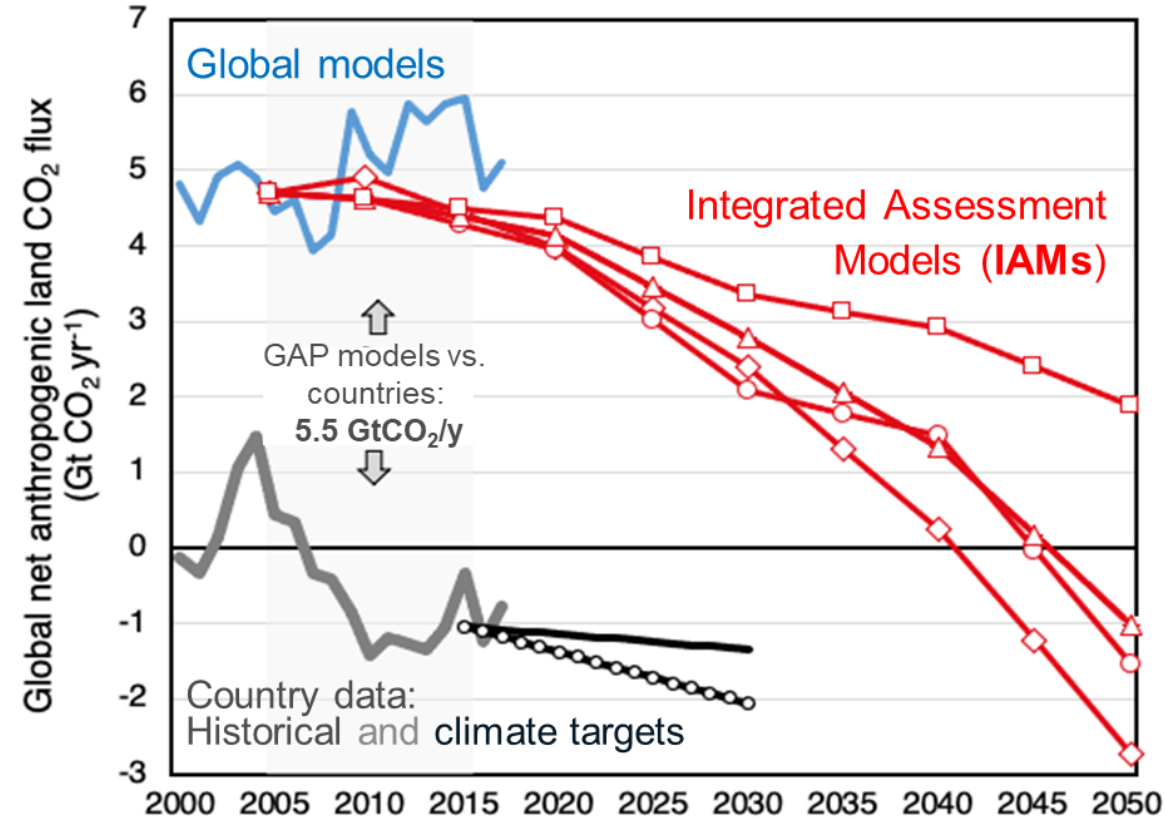
This difference is mainly due to differences in how anthropogenic forest sinks and areas of managed land are defined.

CO₂ sinks on countries' managed forest area which are due to environmental change

LULUCF in global models



LULUCF in national inventories



Grassi et al. 2021

Neither method is inherently preferable.

The large uncertainty of CO₂-LULUCF emissions can lead to substantial revisions to estimated emissions.

AFOLU_IAMs pathways

Significant near-term mitigation potential at relatively low cost **but cannot compensate for delayed emission reductions in other sectors.**

IAM pathways rely on afforestation and BECCS as CDR measures.

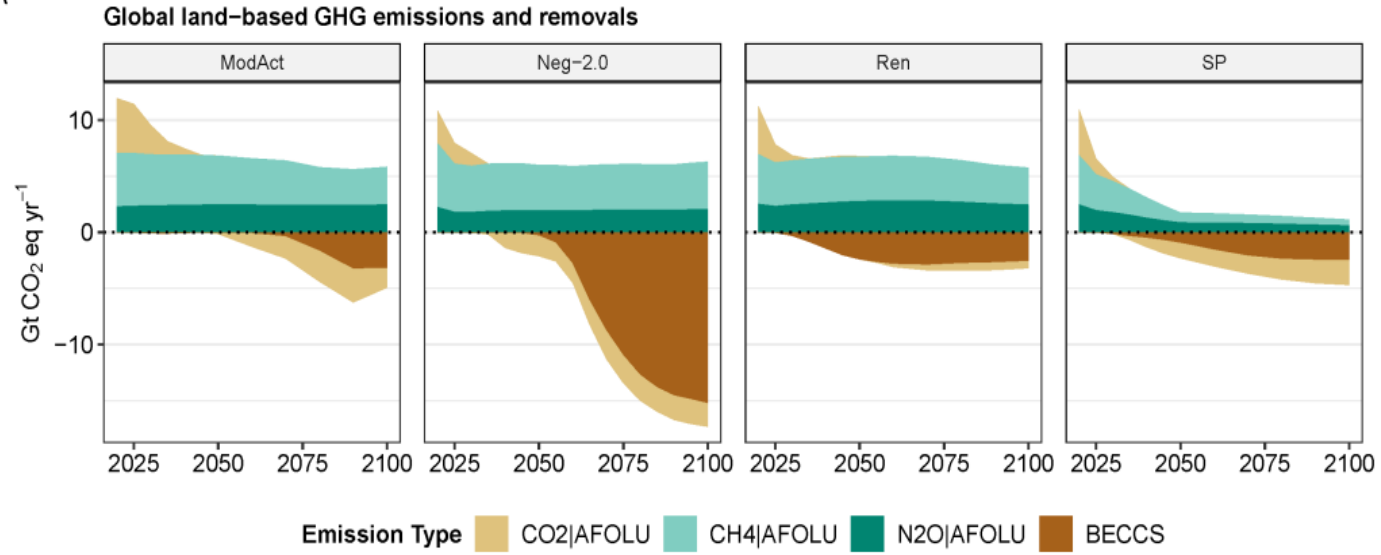
Substantial reductions in CO₂ emissions, modest reductions in CH₄ and N₂O emissions

But...

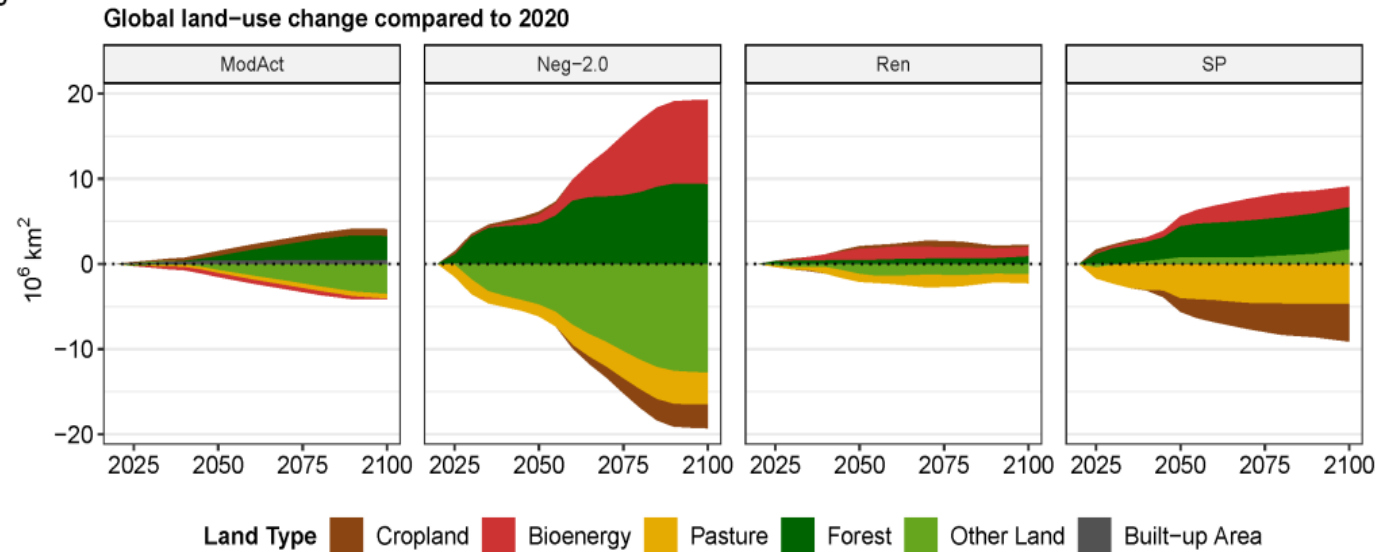
Delayed mitigation action results in substantial land use change in the second half of the century

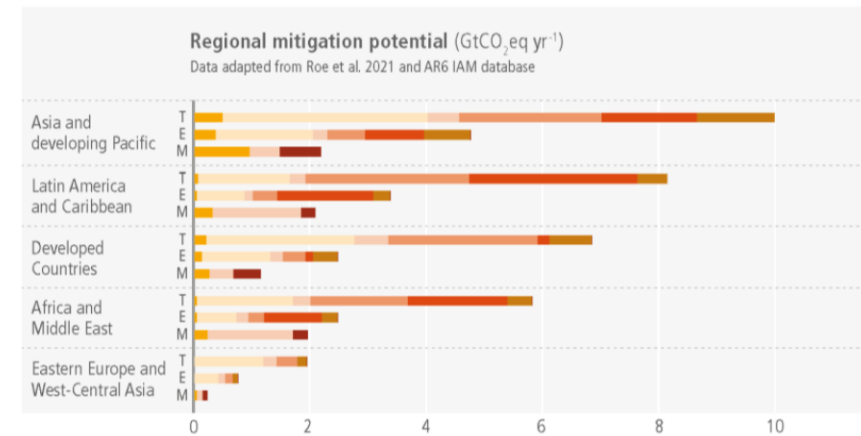
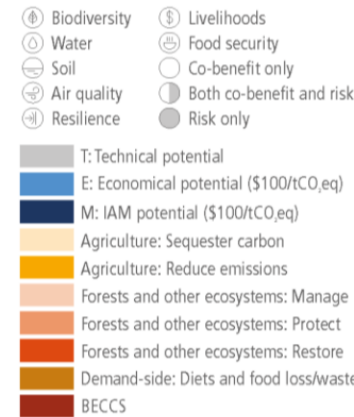
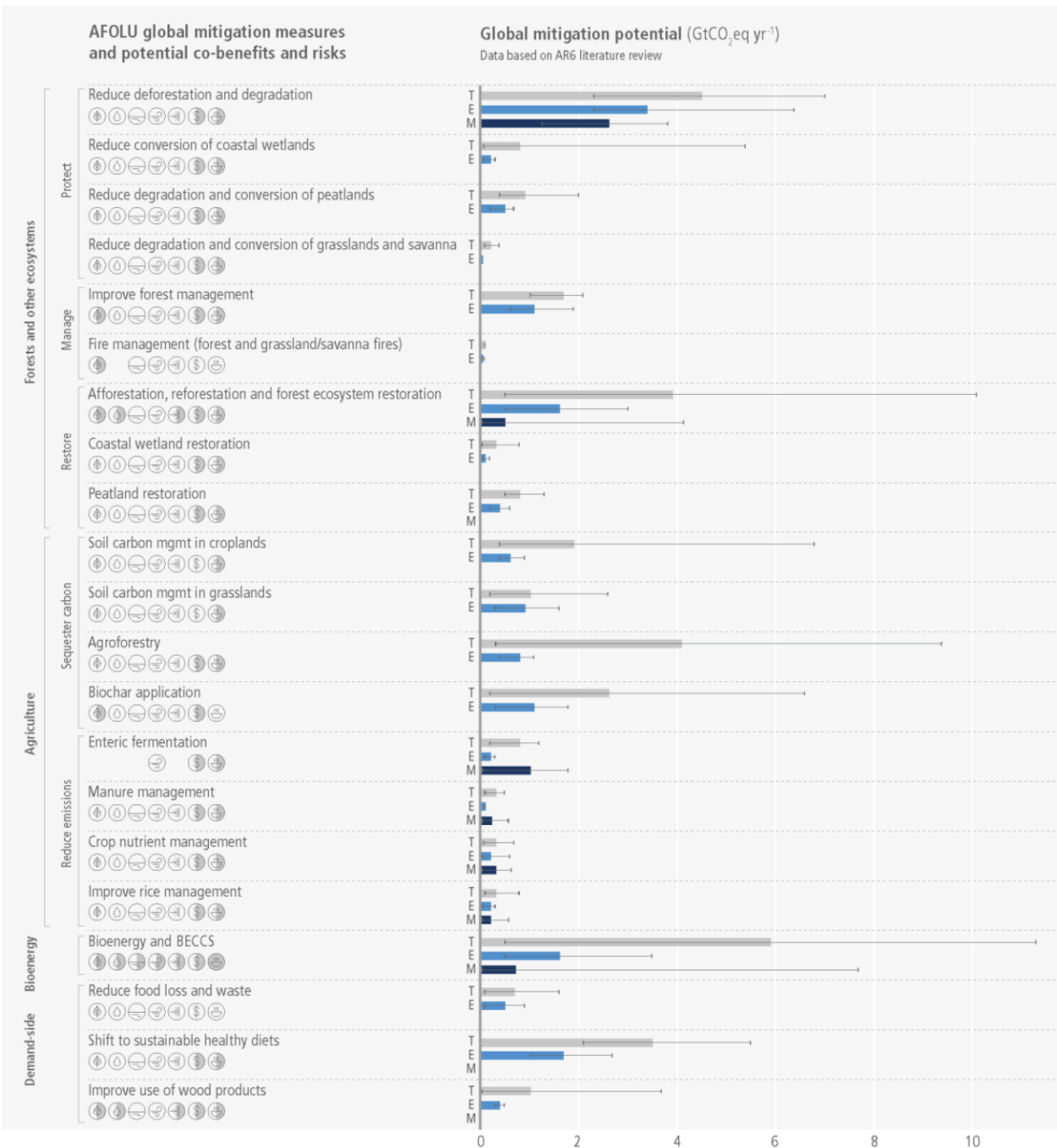
Relay on accumulated carbon resulting from mitigation options that enhance carbon sequestration / Risk of future loss due to disturbances

In the very long term (latter part of the century and beyond) sinks could diminish or even become sources



B





Global and regional mitigation potential (GtCO₂-eq yr⁻¹) in 2020–2050 for 20 land-based measures based on a comprehensive literature review of sectoral studies

WGIII_6AR_Ch7

Synergies and trade-offs to be consider:
Mitigation actions can be adaptive and vice-versa