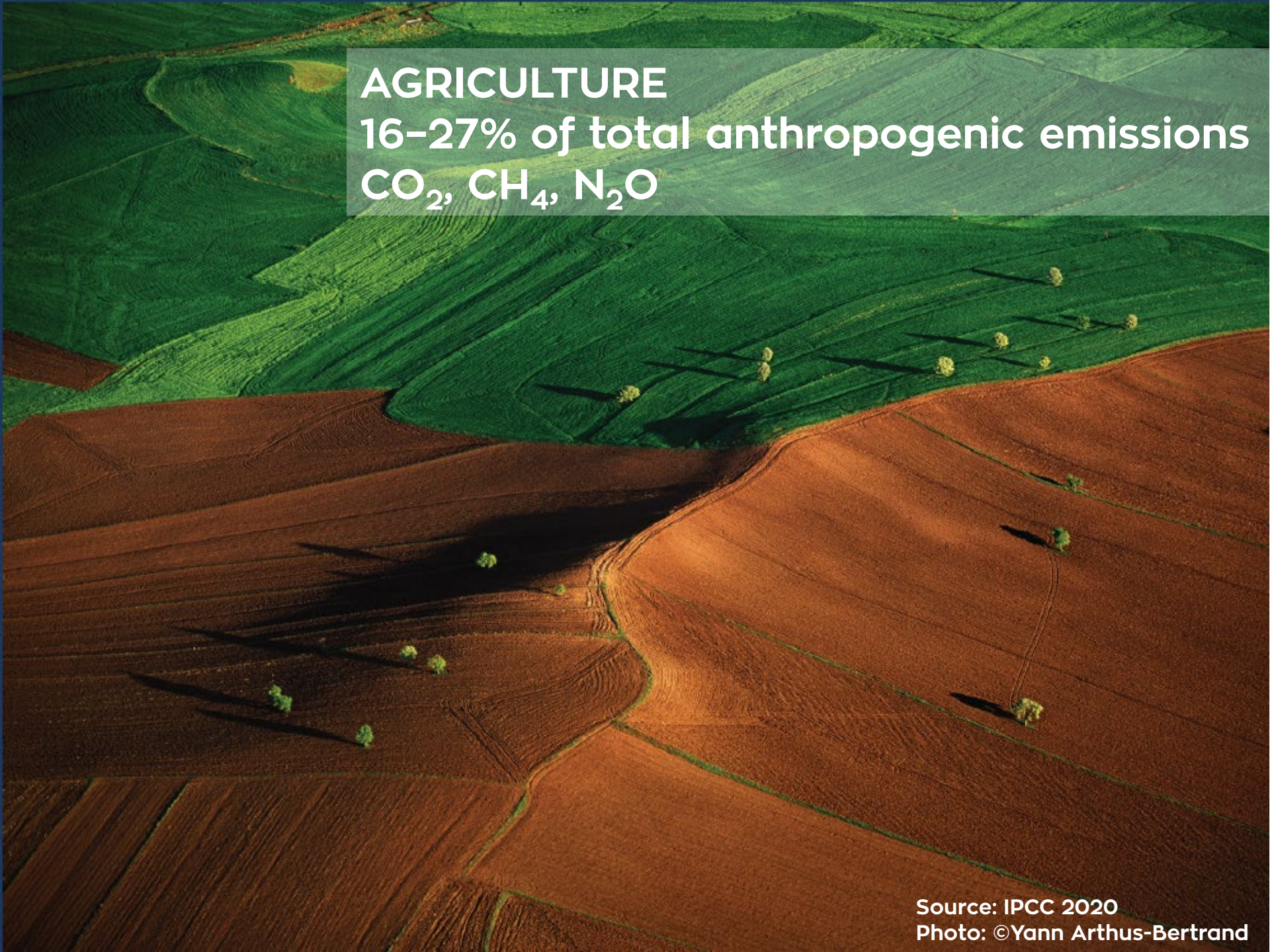


Regreening landscapes for climate adaptation

Eurídice Leyequién Abarca





AGRICULTURE
16–27% of total anthropogenic emissions
CO₂, CH₄, N₂O

Source: IPCC 2020
Photo: ©Yann Arthus-Bertrand



Currently accounting for ca. 70% of global fresh-water use

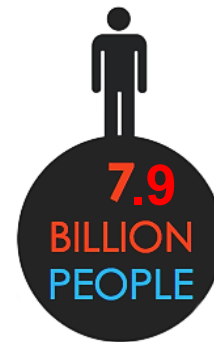
**Roughly 2 billion people (26.7% of the world population)
derive their livelihoods from agriculture**



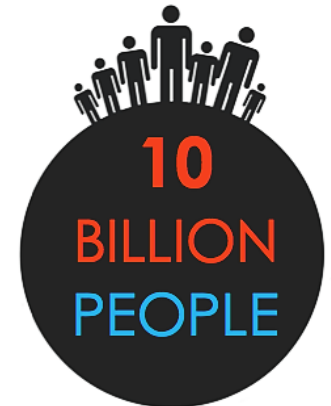
A hungry world



© DieToonDie.com



2022



2050



2

Land surface

29% deserts/ice
71% growable



1

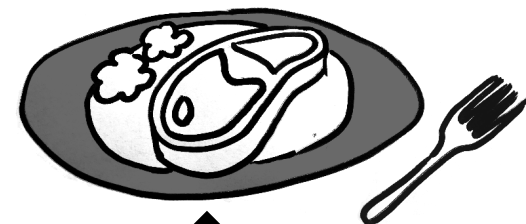
Earth surface

71% ocean
29% land

3

Growable land surface

50% agriculture
48% forested
landscapes
1% urban
1% fresh water

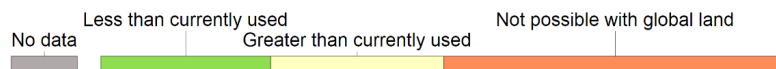
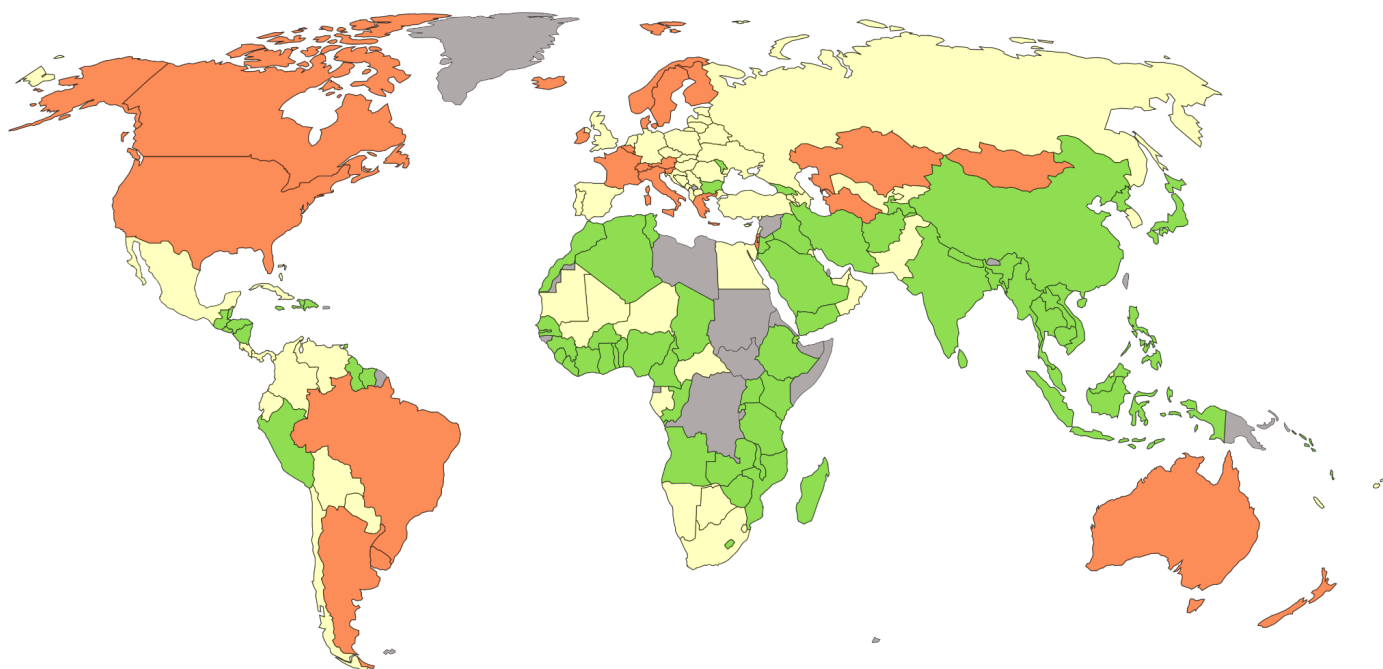




Author: Peter Menzel

What the World Eats





United States 137,65%

Netherlands 99.9%

United Kingdom 94,66%

Russia 81,7%

WORLD 49,5%

Japan 42,7%

Timor 39,6%

India 22,2%

Indonesia 18.3%

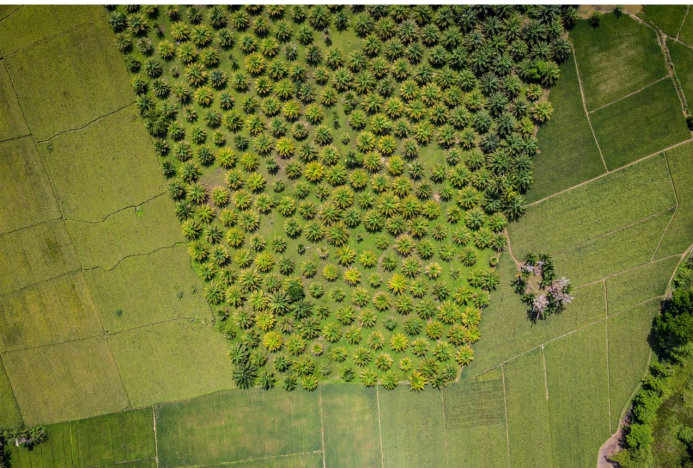
Source: HALF Index (Land Use) - Alexander et al. (2016)

OurWorldInData.org/agricultural-land-by-global-diets • CC BY-SA





What is the option?

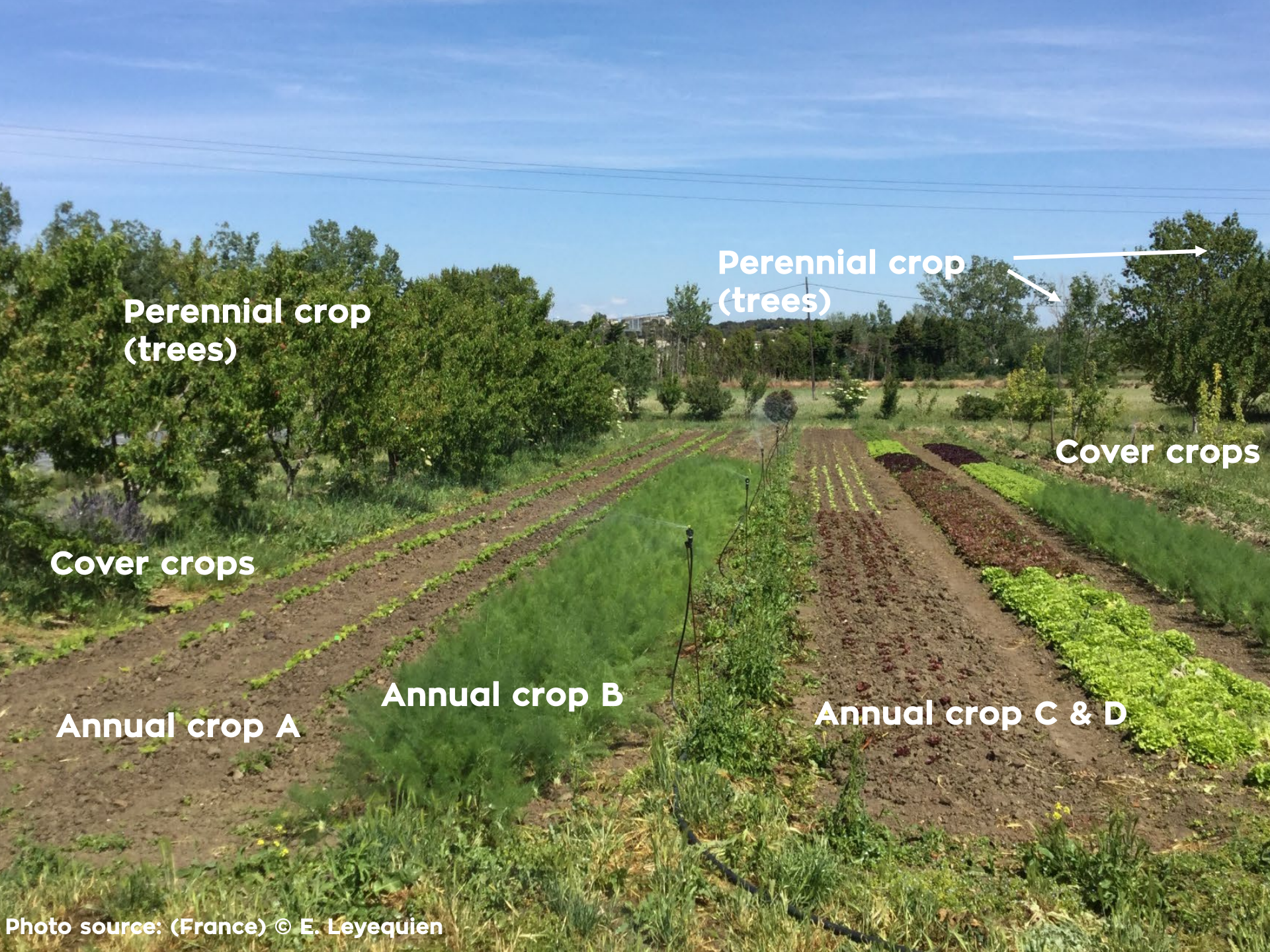


From upper-left to right bottom: PHOTOGRAPH BY © LUCA LOCATELLI, Photos source: <https://www.lowyinstitute.org/the-interpreter/in-java-water-is-running-out>, PHOTOGRAPH BY © GAB MEJIA, PHOTOGRAPH BY © JIM RICHARDSON



Author: Jérôme Bosch, Jardin des délices.





**Perennial crop
(trees)**

**Perennial crop
(trees)**



Cover crops

Cover crops

Annual crop A

Annual crop B

Annual crop C & D

Response options based on land management

Agriculture		Mitigation	Adaptation	Desertification	Land Degradation	Food Security	Cost
	Increased food productivity	L	M	L	M	H	—
	Agro-forestry	M	M	M	M	L	●
	Improved cropland management	M	L	L	L	L	●●
	Improved livestock management	M	L	L	L	L	●●●
	Agricultural diversification	L	L	L	M	L	●
	Improved grazing land management	M	L	L	L	L	—
	Integrated water management	L	L	L	L	L	●●
	Reduced grassland conversion to cropland	L	—	L	L	L	●

Key for criteria used to define magnitude of impact of each integrated response option

		Mitigation <i>Gt CO₂-eq yr⁻¹</i>	Adaptation <i>Million people</i>	Desertification <i>Million km²</i>	Land Degradation <i>Million km²</i>	Food Security <i>Million people</i>
Positive	Large	More than 3	Positive for more than 25	Positive for more than 3	Positive for more than 3	Positive for more than 100
	Moderate	0.3 to 3	1 to 25	0.5 to 3	0.5 to 3	1 to 100
	Small	Less than 0.3	Less than 1	Less than 0.5	Less than 0.5	Less than 1
	Negligible	No effect	No effect	No effect	No effect	No effect
Negative	Small	Less than -0.3	Less than 1	Less than 0.5	Less than 0.5	Less than 1
	Moderate	-0.3 to -3	1 to 25	0.5 to 3	0.5 to 3	1 to 100
	Large	More than -3	Negative for more than 25	Negative for more than 3	Negative for more than 3	Negative for more than 100
Variable: Can be positive or negative		no data	na	not applicable		

Confidence level

Indicates confidence in the estimate of magnitude category.

H High confidence
M Medium confidence
L Low confidence

Cost range

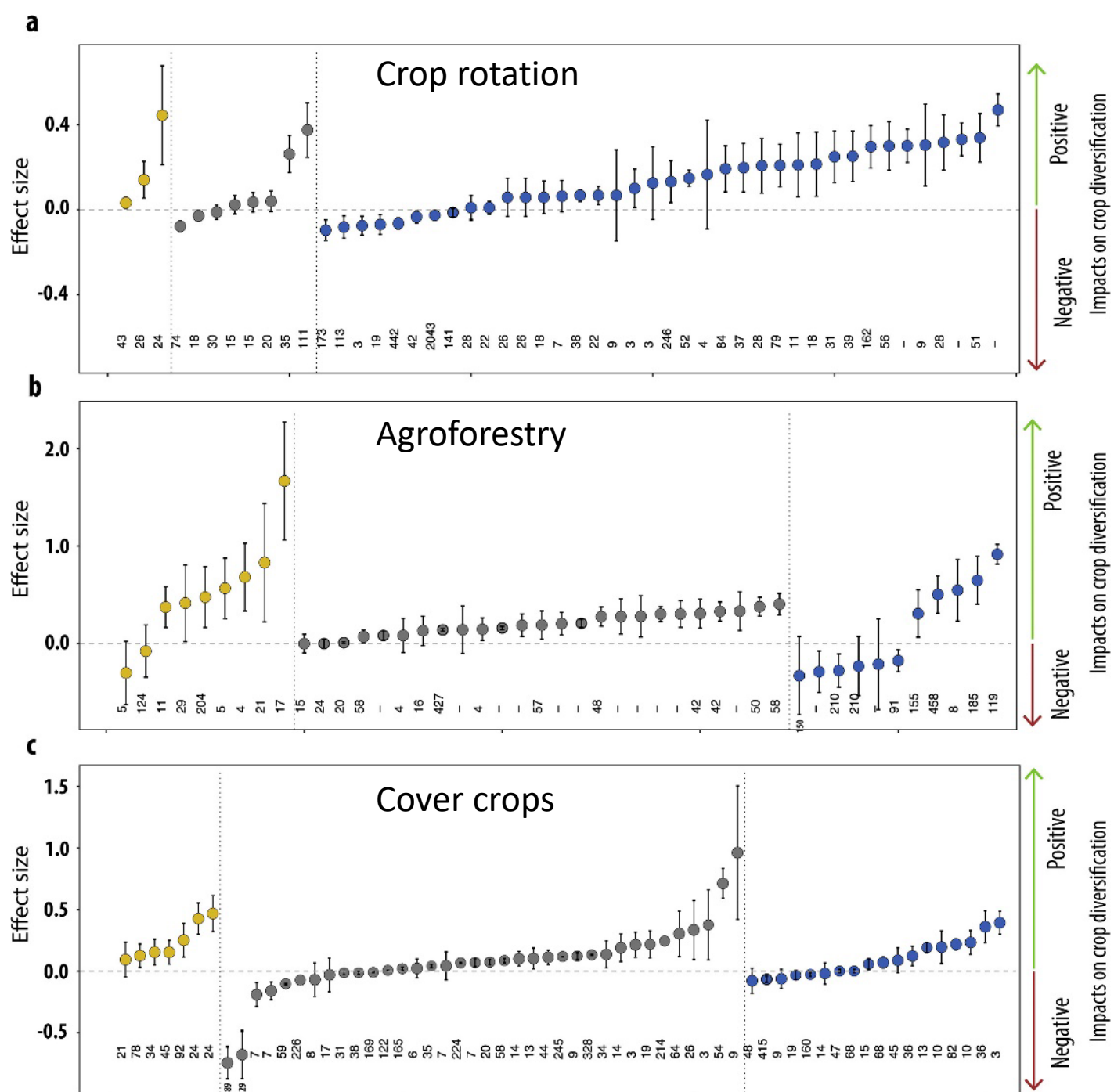
See technical caption for cost ranges in US\$ tCO₂e⁻¹ or US\$ ha⁻¹.

●●● High cost
●● Medium cost
● Low cost
— no data

Mixed timber

Wheat

 Biodiversity (yellow)
 Soil quality (grey)
 Productivity levels (blue).



Beillouin, D. *et al.* 2019. A dataset of meta-analyses on crop diversification at the global scale. Data in brief. <https://doi.org/10.1016/j.dib.2019.103898>

Walnut trees





Deadly floods, caused by historic rainfall, struck Germany (Erftstadt-Blessem) in July 2021.

PHOTOGRAPH BY RHEIN-ERFT-KREIS, PICTURE-ALLIANCE/AP IMAGE



**Food Forest Ketelbroek in the Netherlands remains green
even during drought**

PHOTOGRAPH BY © JACOB KAPTEIN