



Food systems and climate mitigation

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Food systems exert important pressures on the environment

Land use

50%

of all ice- and desert-free land is used for agriculture

Deforestation

73%

of tropical and sub-tropical deforestation (2000-10)

Biodiversity loss

80%

of threatened land species are in danger due to habitat loss driven by agriculture

Water use

70%

of global freshwater use

Water pollution

78%

of global eutrophication

Global warming

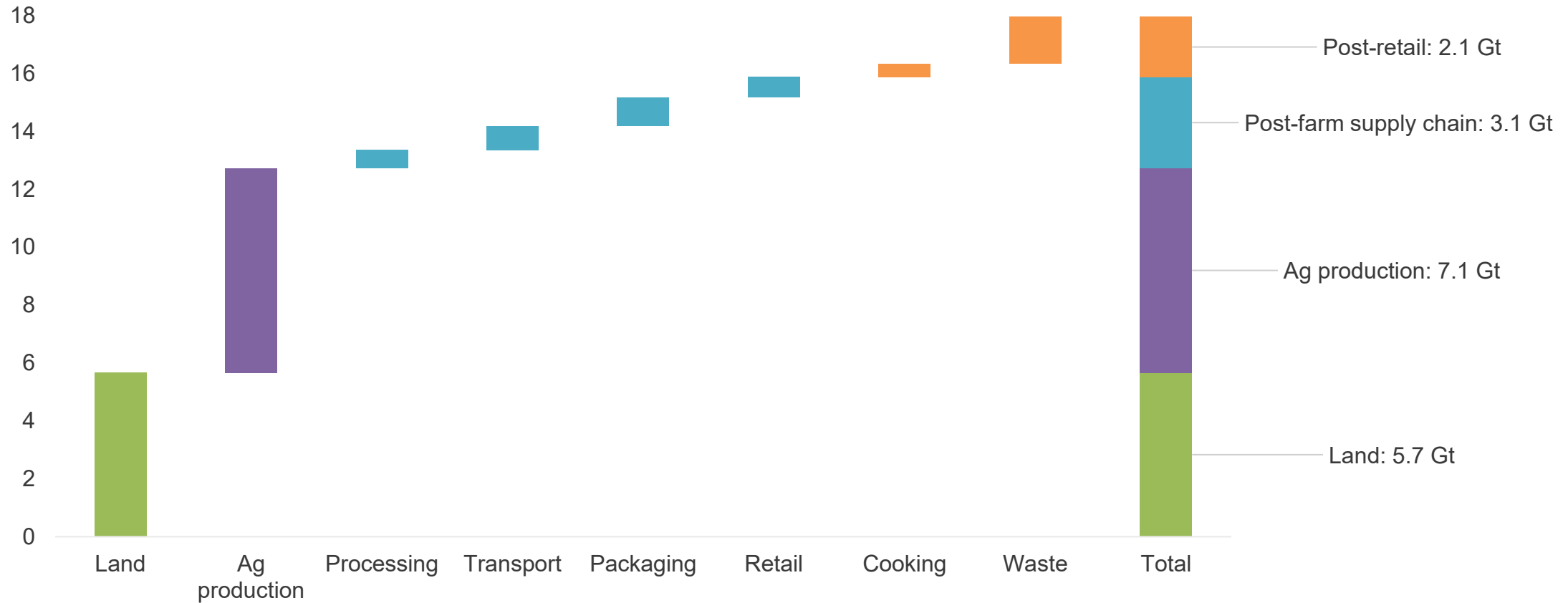
21-37%

of man-made GHG emissions



Globally, most food emissions occur through land use change and agricultural production

Food systems GHG emissions by supply chain stage, 2015

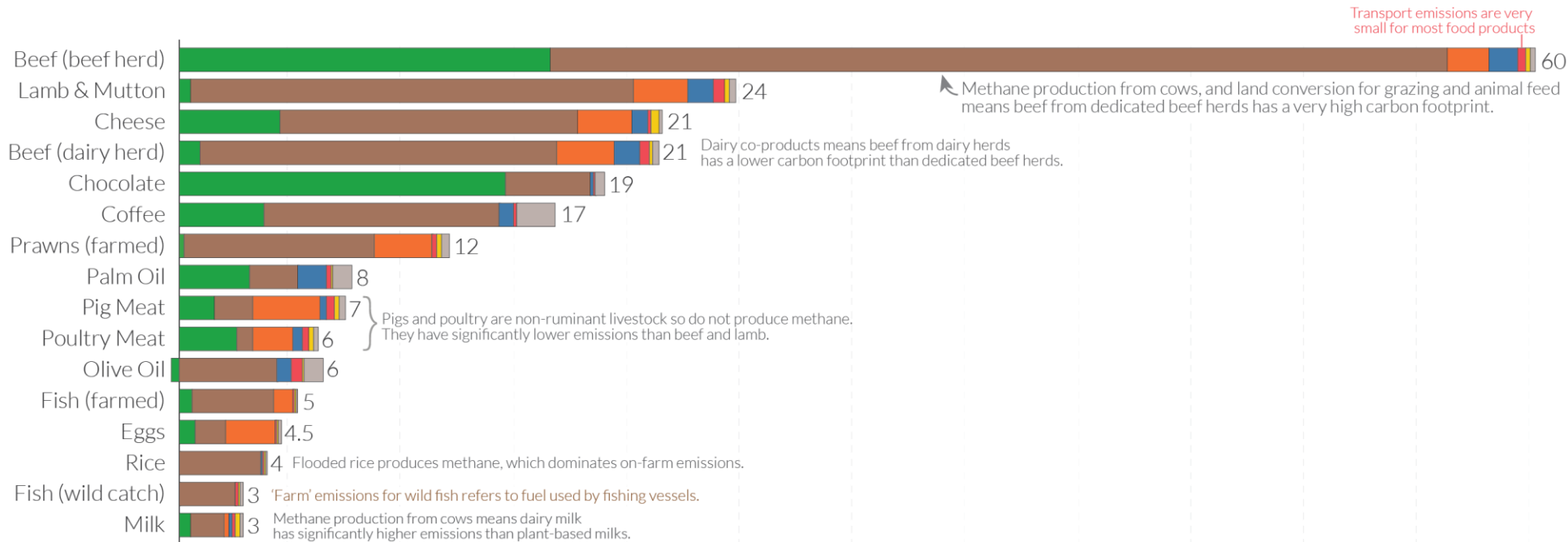
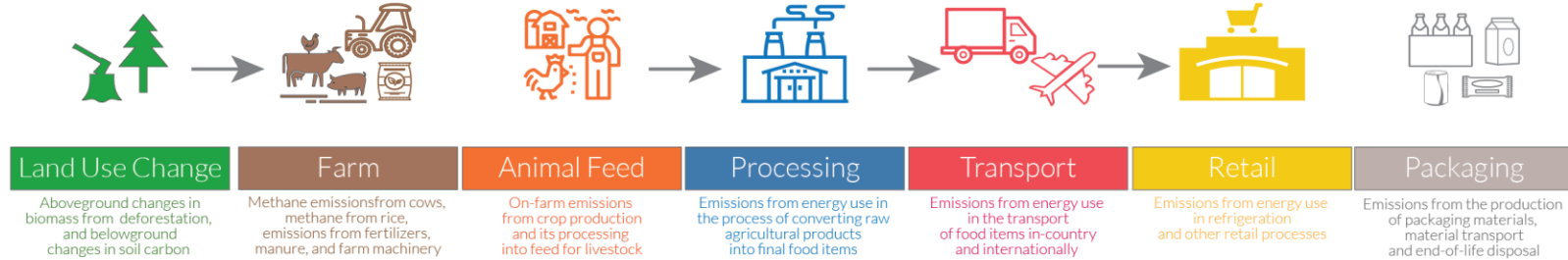


Source: Crippa et al. (2021), *Nature Food*. Also see Tubiello et al. (2021) and IPCC (2019)



Ruminant products (beef, lamb, cheese) have high emissions intensity

Food: greenhouse gas emissions across the supply chain





But there is an enormous variability across producers

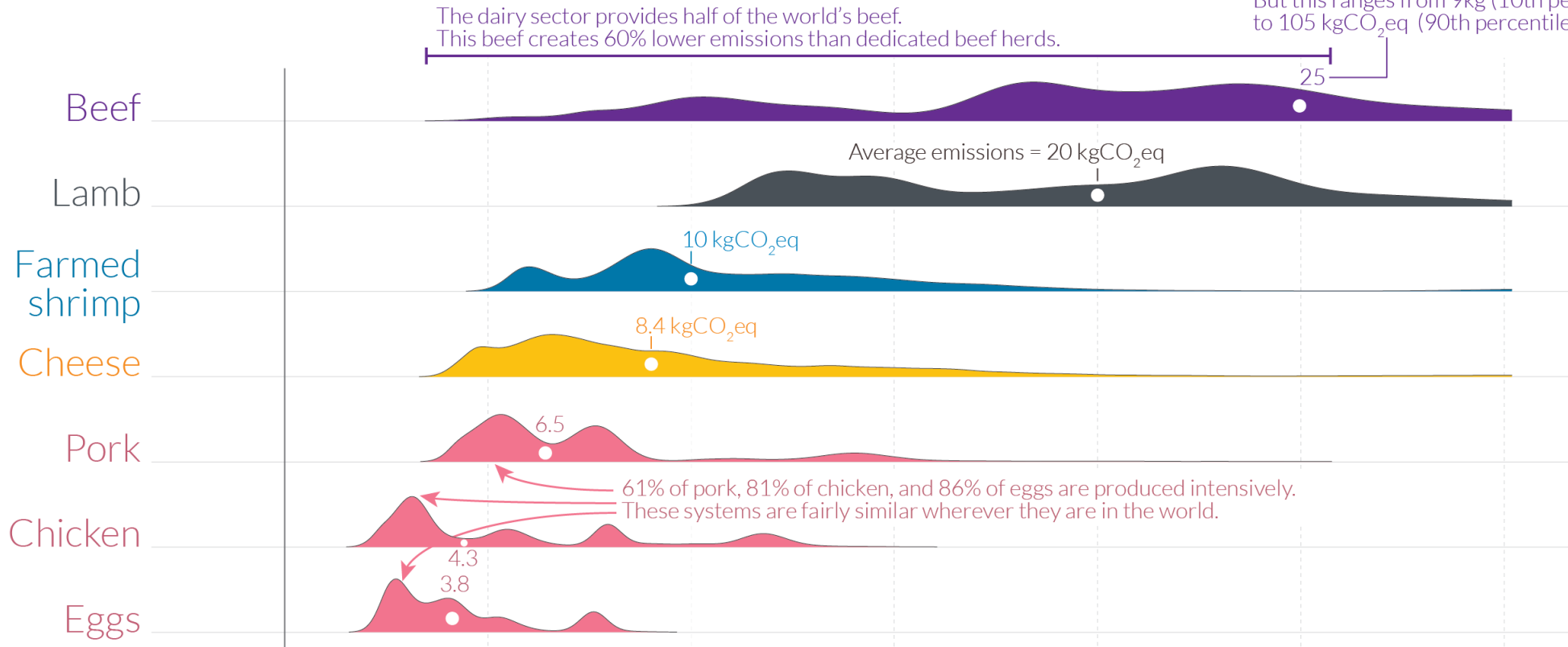
How does the carbon footprint of protein-rich foods compare?

Our World
in Data

Greenhouse gas emissions from protein-rich foods are shown per 100 grams of protein across a global sample of 38,700 commercially viable farms in 119 countries.

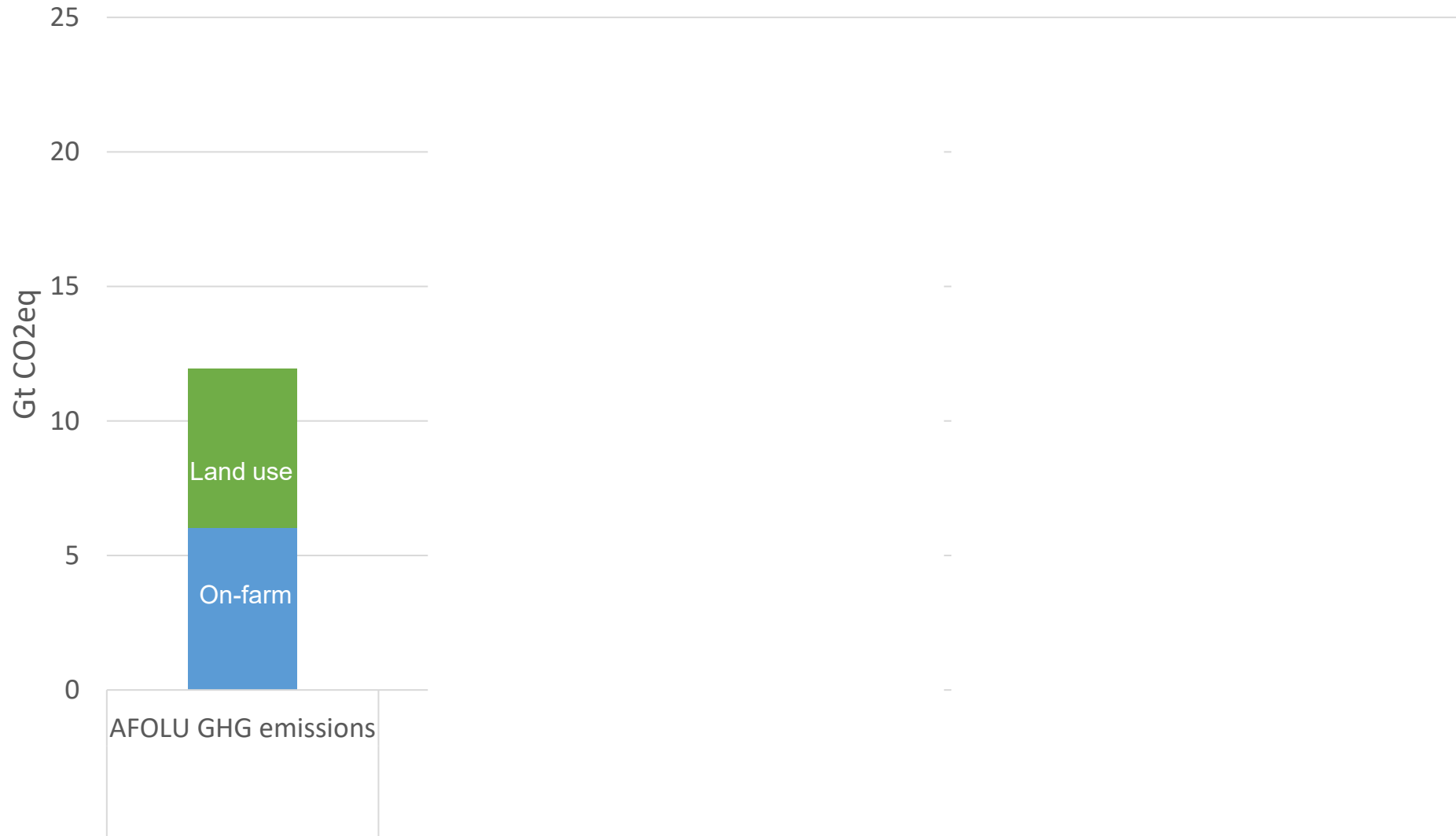
The height of the curve represents the amount of production globally with that specific footprint. The white dot marks the median greenhouse gas emissions for each food product.

Producing 100 grams of protein from beef emits 25 kilograms of CO₂eq, on average. But this ranges from 9kg (10th percentile) to 105 kgCO₂eq (90th percentile).





“Agriculture, forestry and other land use” (AFOLU) has significant abatement potential





Governments have a range of policy options to reduce agricultural emissions at home

Emissions pricing instruments



- Emissions taxes
- Emissions trading schemes/carbon offsets (New Zealand ETS)
- Abatement subsidies (Australia Emissions Reduction Fund)

Agricultural support, grants, preferential credits



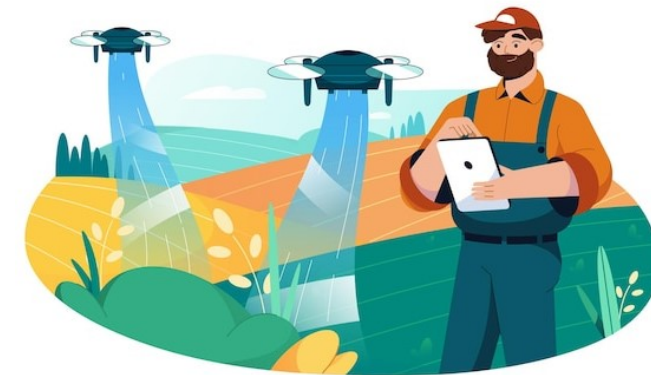
- Agricultural support (EU CAP)
- Grants (United States biogas)
- Dedicated credit line (Brazil ABC programme)

Environmental regulations



- Pollution regulations (EU nitrates directive; Canada clean fuel standard; Switzerland water quality plan)

R&D and knowledge transfer

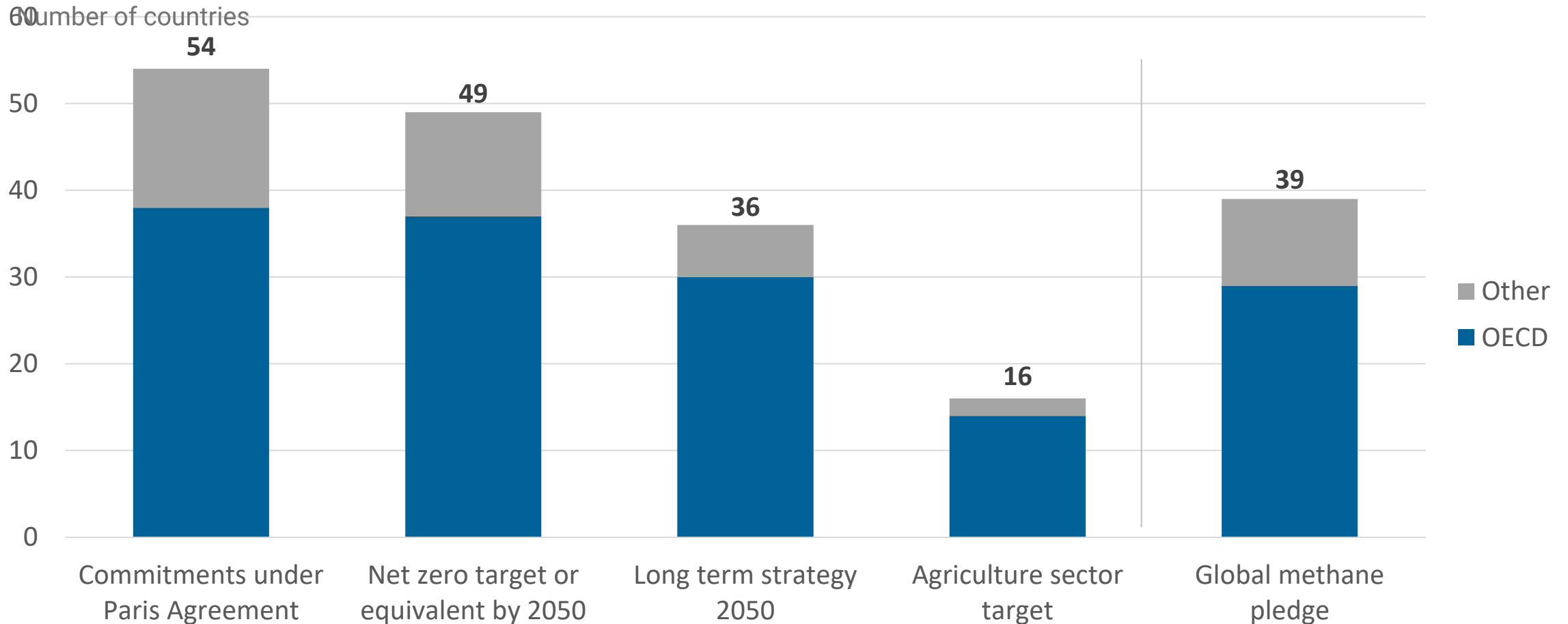


- R&D (Global Research Alliance; USDA climate hubs)
- Knowledge transfer



But very few countries have specific emissions reduction targets for agriculture

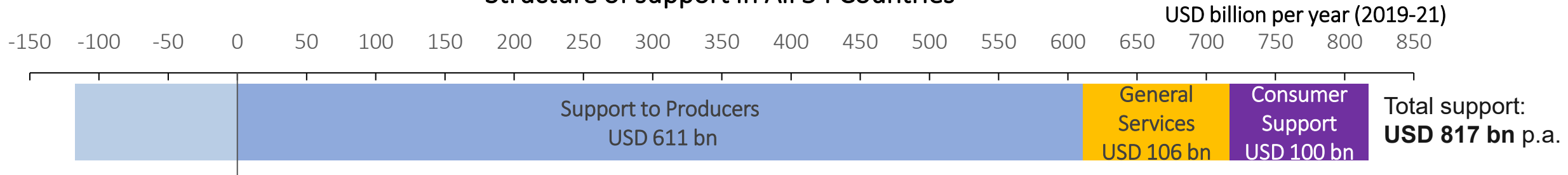
There is significant scope to intensify and accelerate emissions reduction in the sector





Most support is provided to individual producers – but very little helps with climate change mitigation

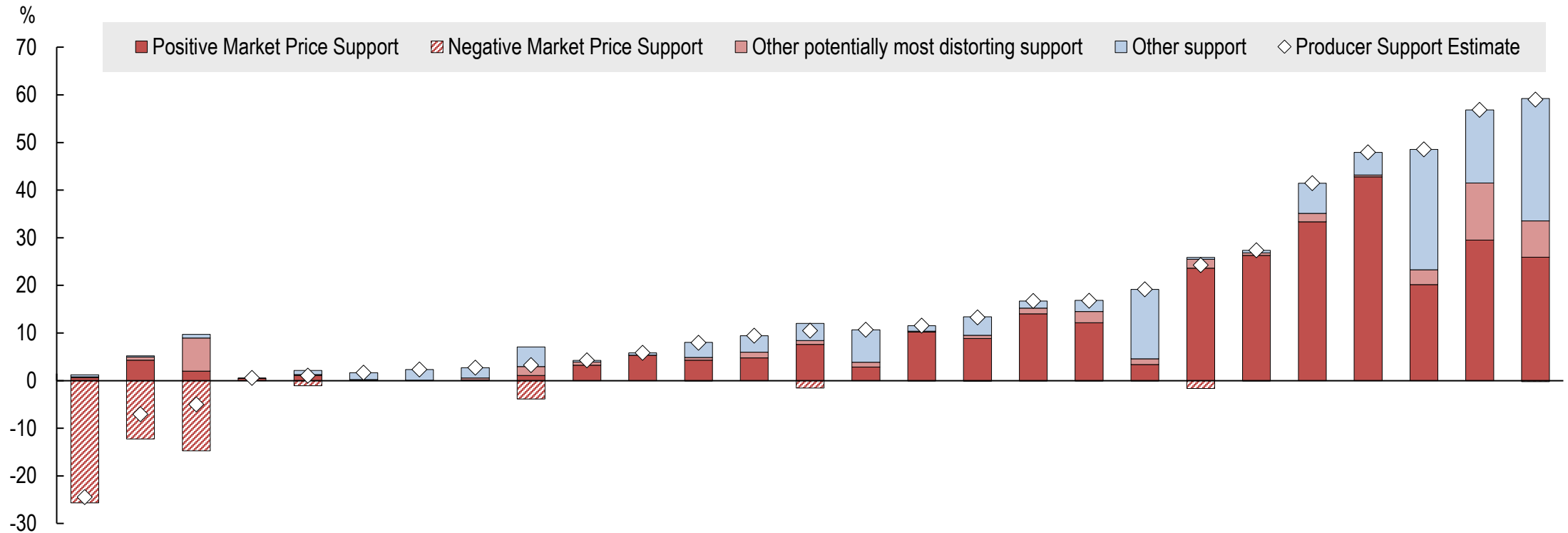
Structure of support in All 54 Countries





Countries differ strongly in how much support they give, and through which instruments

Producer Support Estimate, 2017-19 (percentage of gross farm receipts)

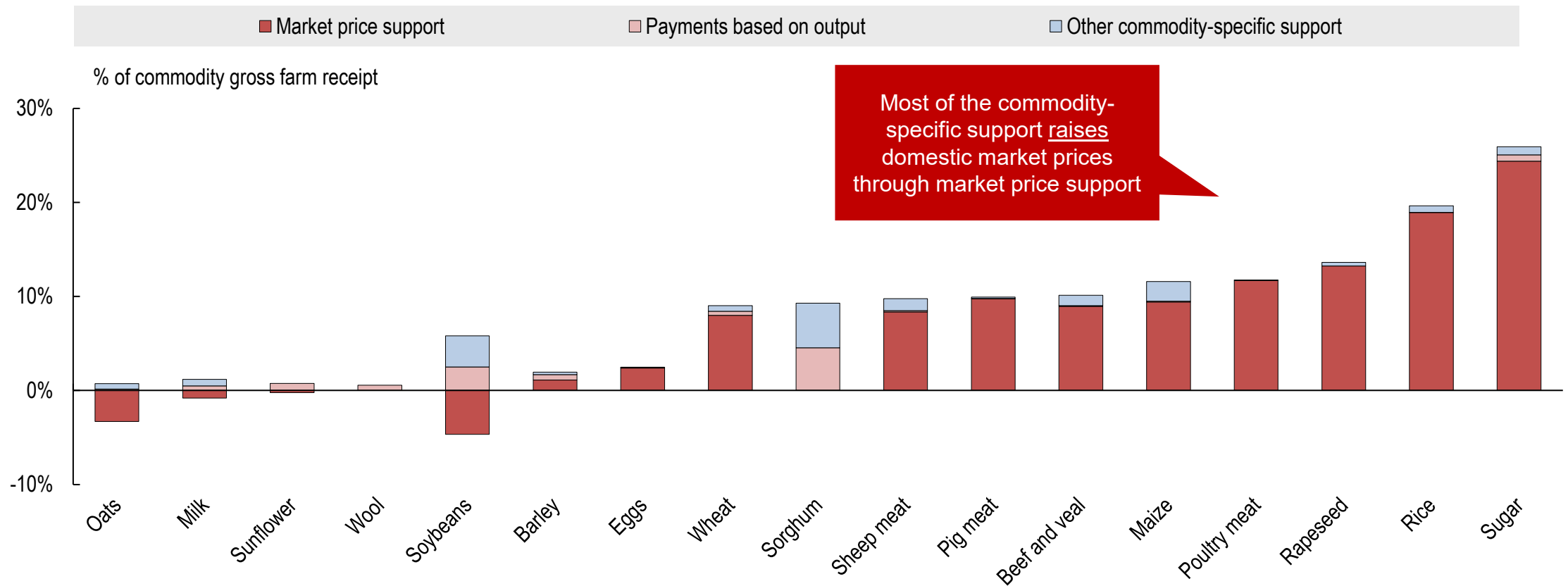


Source: OECD (2020), Agricultural Policy Monitoring and Evaluation 2020



Globally, more than half of producer support targets specific commodities, notably sugar and rice

Transfers to specific commodities, 2017-19 (% of commodity gross farm receipt)

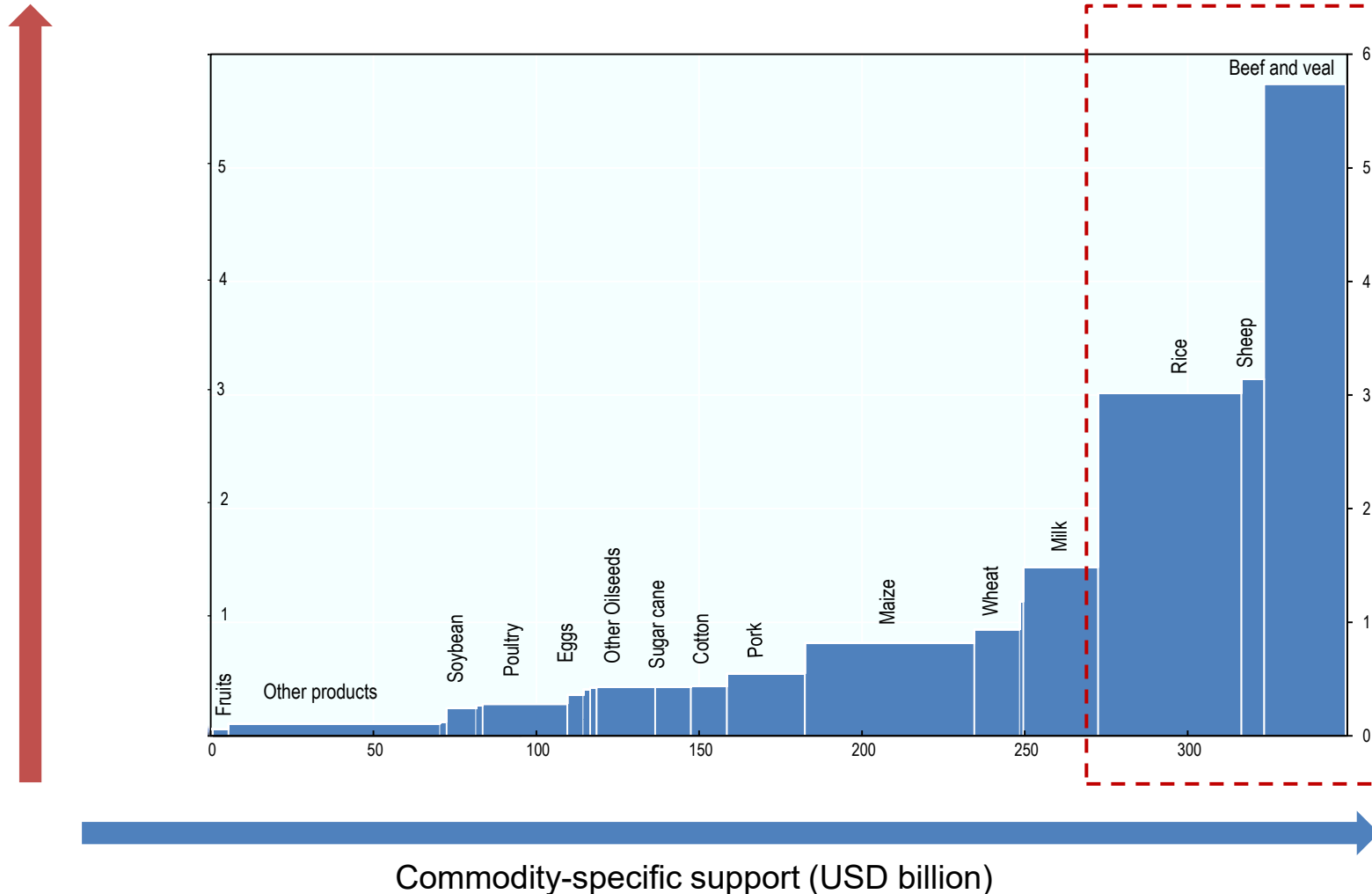


Source: OECD (2020), Agricultural Policy Monitoring and Evaluation 2020



Current policies worldwide provide significant support to commodities with high emissions intensities

Emission intensity (kg CO₂/USD)



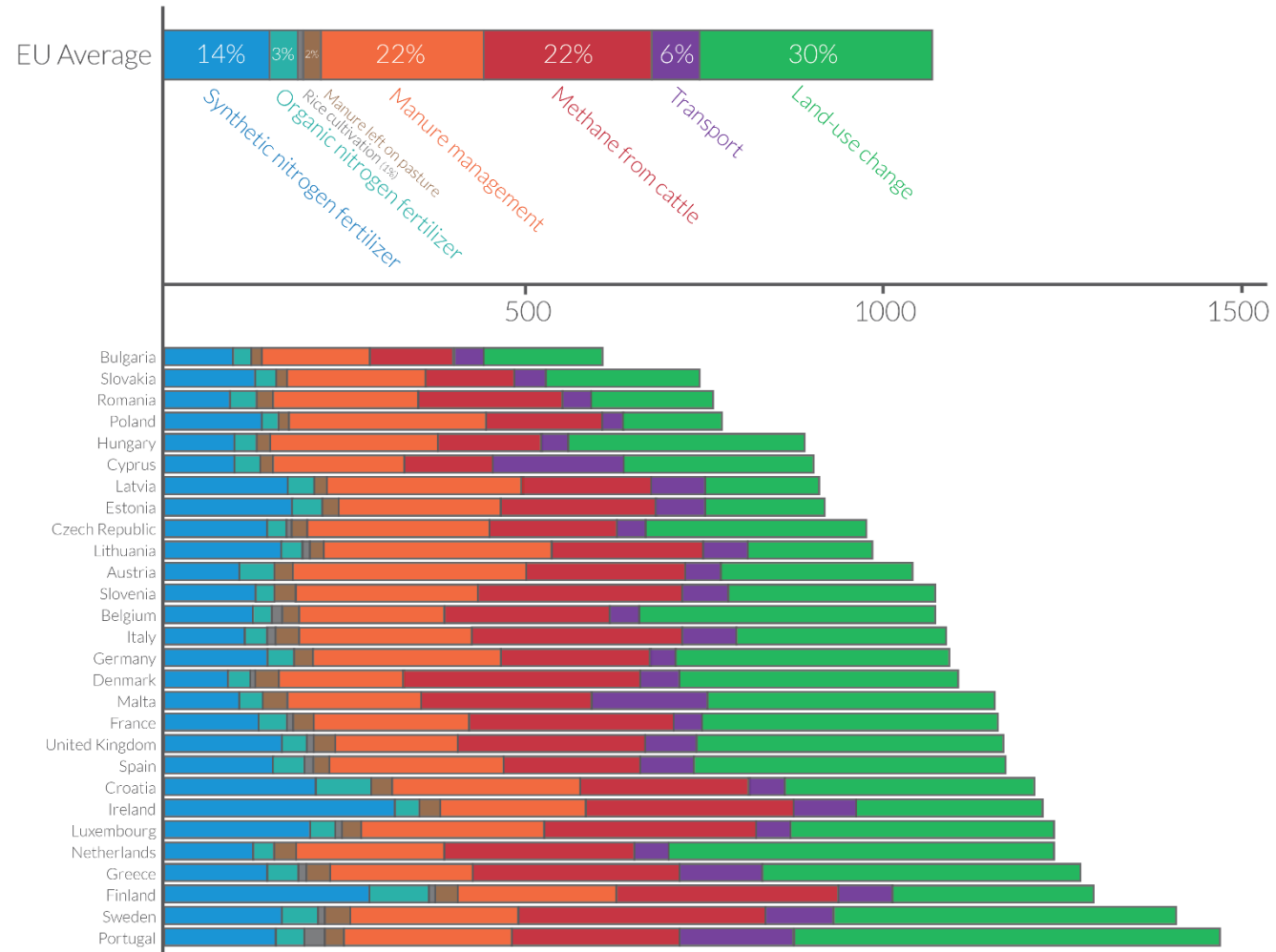
USD 361 billion per year in transfers to specific commodities, driving higher domestic GHG emissions

➤ **USD 76 billion** of commodity-specific support for beef and veal, sheep meat and rice production



We can also look at *consumption-based* indicators to complement production-based data

Carbon footprint of diets across the European Union: where in the supply chain do emissions come from? 

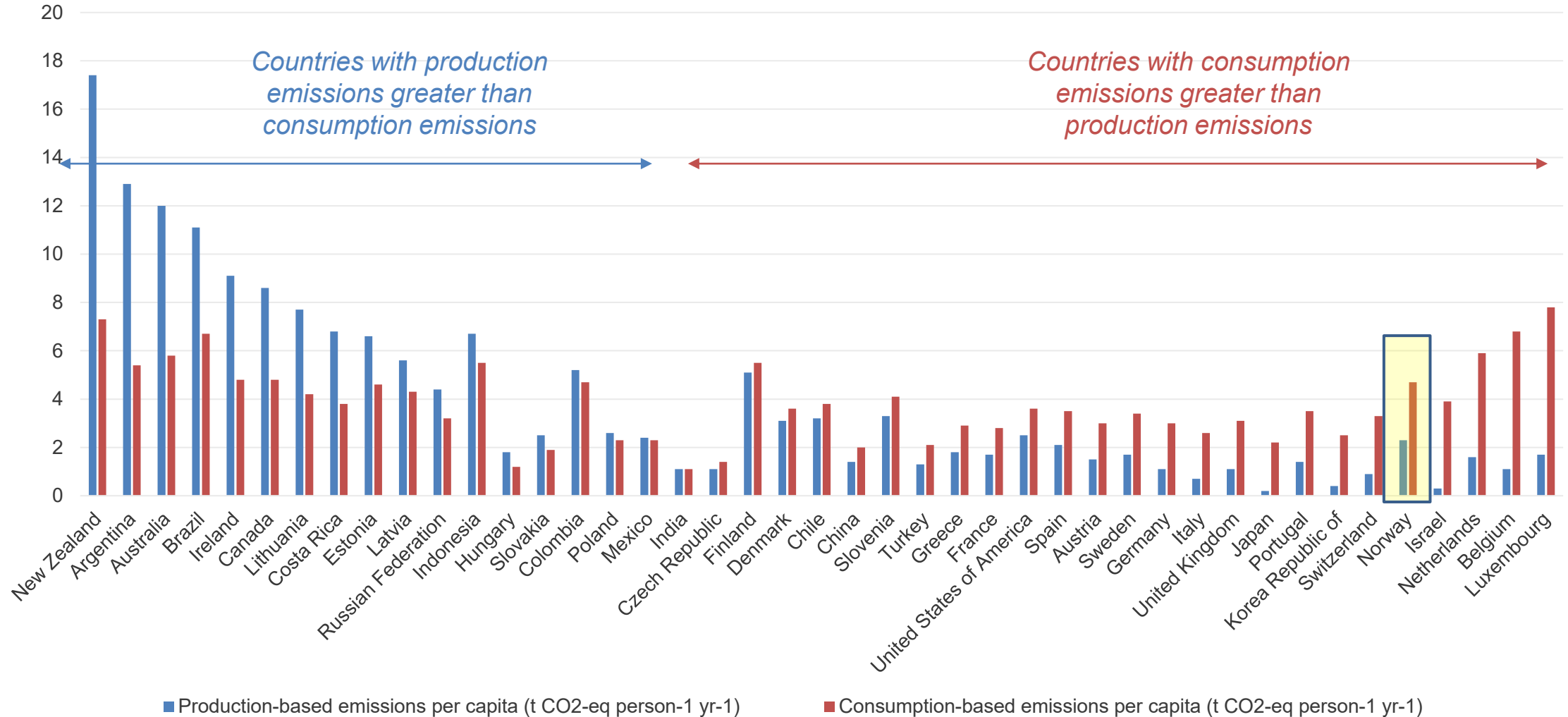


Source: Sandström et al. (2018) *Global Food Security*




Data suggests that Norway is a net importer of food-related emissions

Land use and agriculture emissions per capita





There is a growing emphasis on measuring and communicating carbon footprints in food systems



Impact grade label: MP54

Method: Farm to shelf

Certified on: 10/10/2022

Assessed for sale in:
United Kingdom

Ecological impact

Typical Value	Per 100	Per serving	Grade per serving
Carbon (CO ₂ eq)	136.00	543.00	B
Water Usage (L eq)	393.00	1,342.00	E
Water Pollution (PO ₄ ³⁻)	1.00	3.00	D
Biodiversity (Species Loss Index)	0.00	1.00	A



Four action pillars for climate change mitigation in agriculture

1.

Phase out policy measures worsening global warming

- Remove environmentally harmful subsidies and reorient support
- Reducing support to sectors with highest emission intensity

2.

Apply adequate mitigation incentives to trigger action

- Implement an effective pricing system for agricultural GHG emissions
- Unlock carbon sequestration in biomass and soil
- Develop and test MRV methodologies

3.

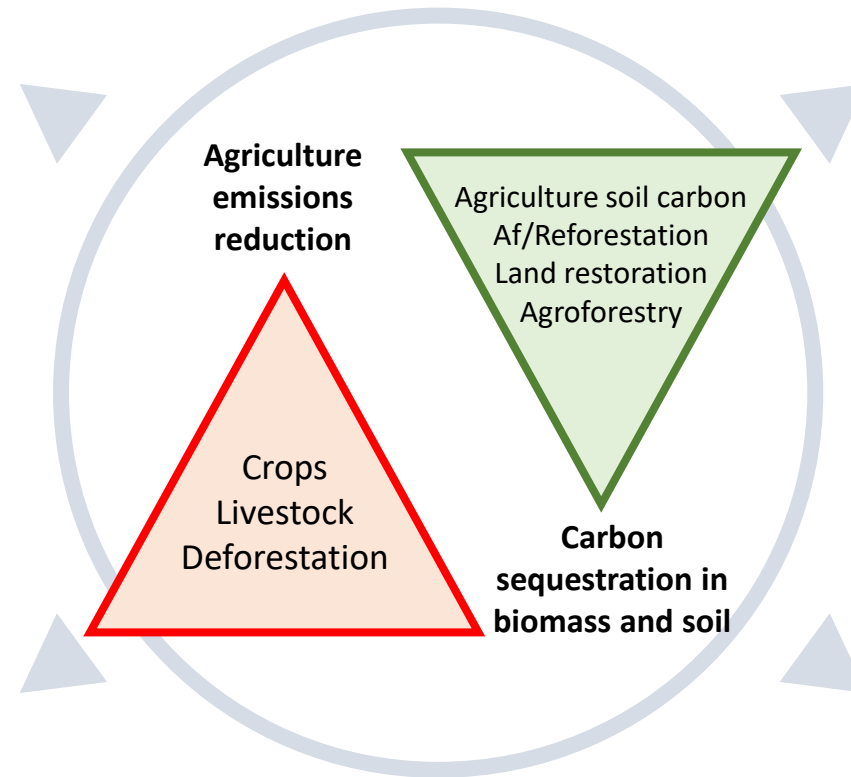
Invest in innovation and knowledge transfer

- Increase support to general services
- Boost innovation on climate-friendly technologies, including through public-private research partnerships

4.

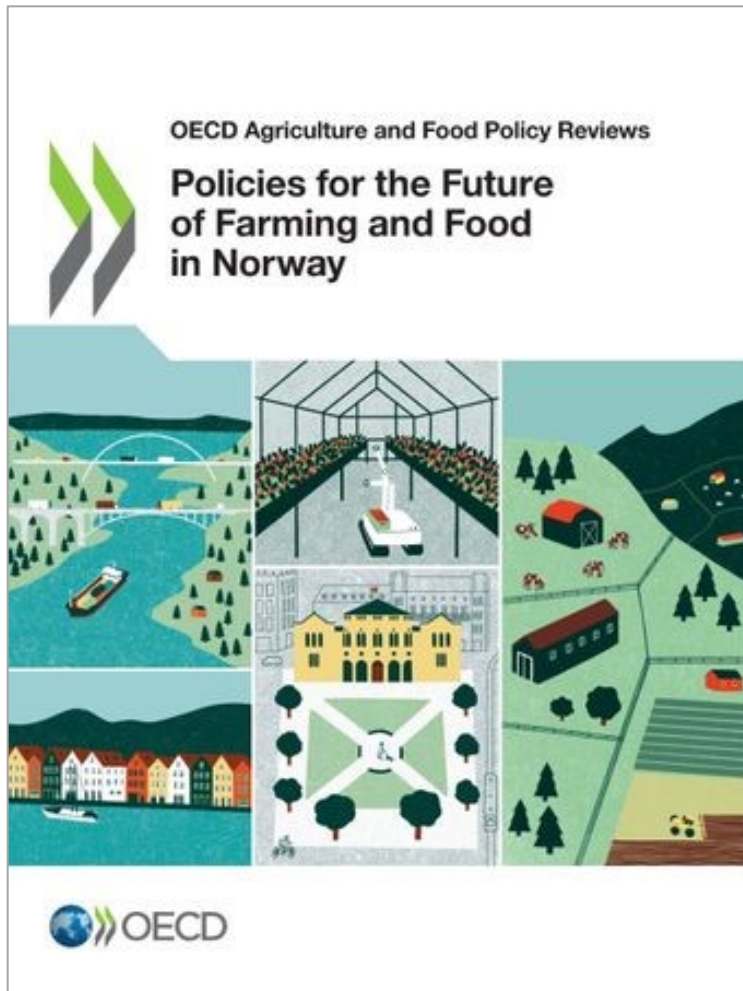
Shift to more sustainable consumption patterns

- Encourage consumption shifts towards lower emission intensity products
- Reduce overconsumption, food waste and losses





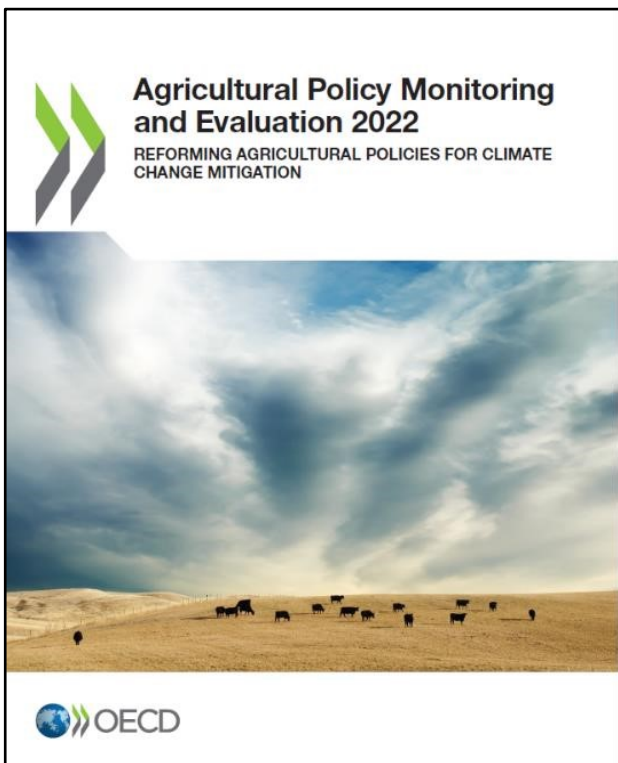
OECD review of Norway (2021) – main messages



1. Norway is **delivering unevenly** across its four agricultural policy objectives (food security, maintaining production, increasing value added, and env sustainability)
2. **Support** to the agricultural producers is the **highest** among the 54 countries measured by OECD measures, **but not targeted** to innovation for productivity and sustainability
3. The innovation system has **good research institutions** but private sector **lacks the complementary incentives**
4. A new policy approach is possible: increasing sector's responsiveness to market signals, private innovation and focus on **agri-environmental outcomes**



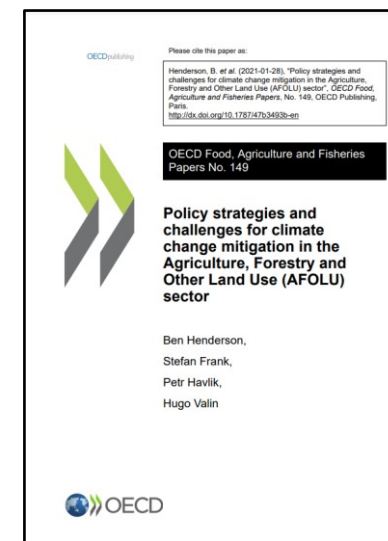
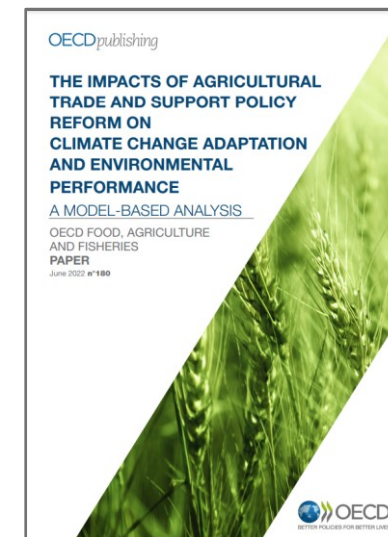
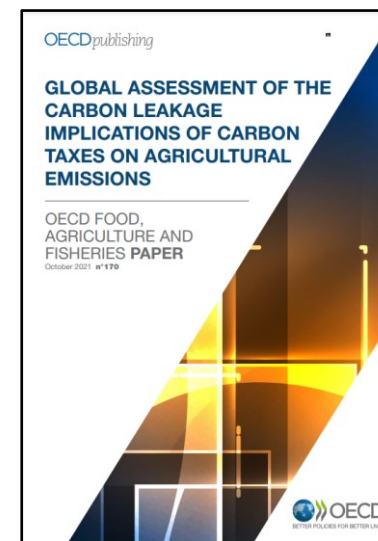
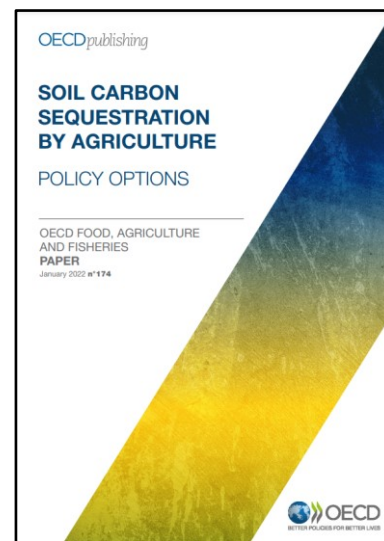
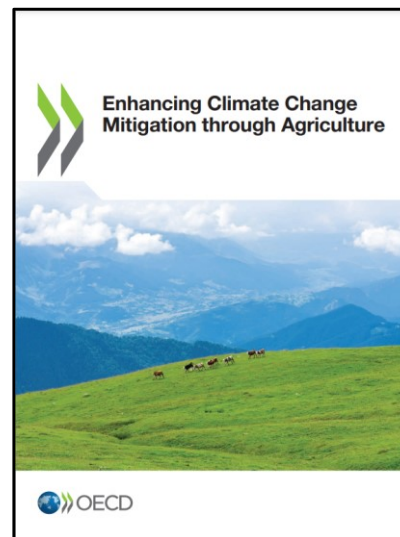
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