



Food and Agriculture Organization
of the United Nations

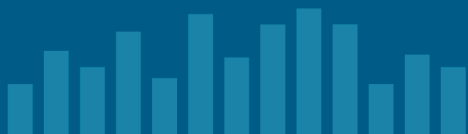
>> FAO Statistics Division

Greenhouse gas emissions from food systems

Francesco N Tubiello

Raising ambitions for food systems and climate change by uniting science and policy

Eighth Meeting of the Expert Group on Environment Statistics, Oct 2021



- Food and agriculture have shaped human culture and civilization from the start, and now affect the planet at all scales
- Emissions from food systems are large, roughly one-third of the total!
- How can countries better characterize food systems within their climate ambitions, i.e., commitments to reduce their greenhouse gases?

Intro (Cont'd): Two set of actions necessary

1. Advance data research to help track food systems emissions by gas, process and country over time—so proper trends can be identified and effective actions implemented
2. Help to map climate policy jargon onto food and agriculture concepts that are readily recognizable by farmers and consumers alike

Defining Food Systems within Food and Agriculture

Food Systems View

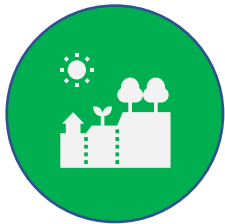
GHG Share



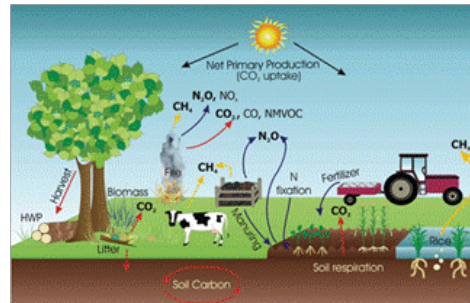
Farm gate



13%



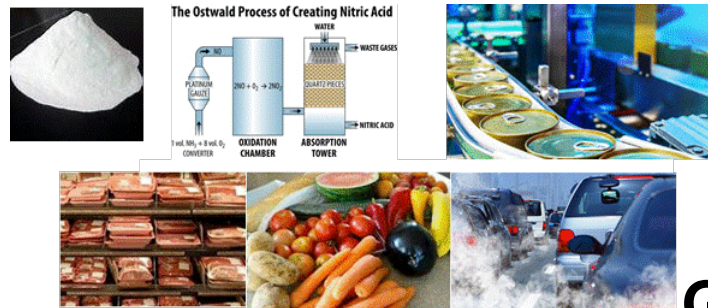
Land use change



9%



Pre- and post-production

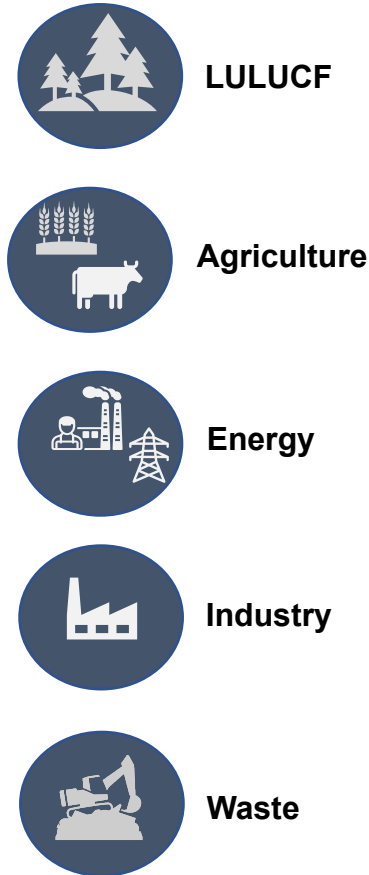


11%

Grand Total: 33%!

Mapping Climate Policy to Food and Agriculture

Climate Policy View



Food Systems View



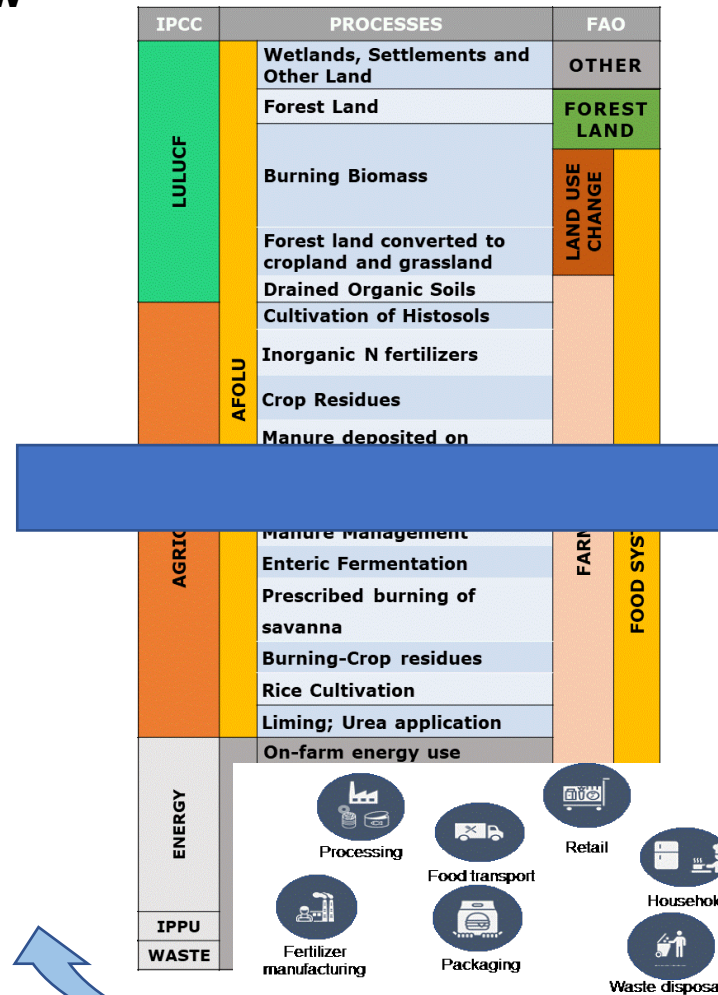
Farm gate



Land use change



Pre- and post-production



Inventory sectors, NDCs

Percentage shares and emissions data
FAOSTAT

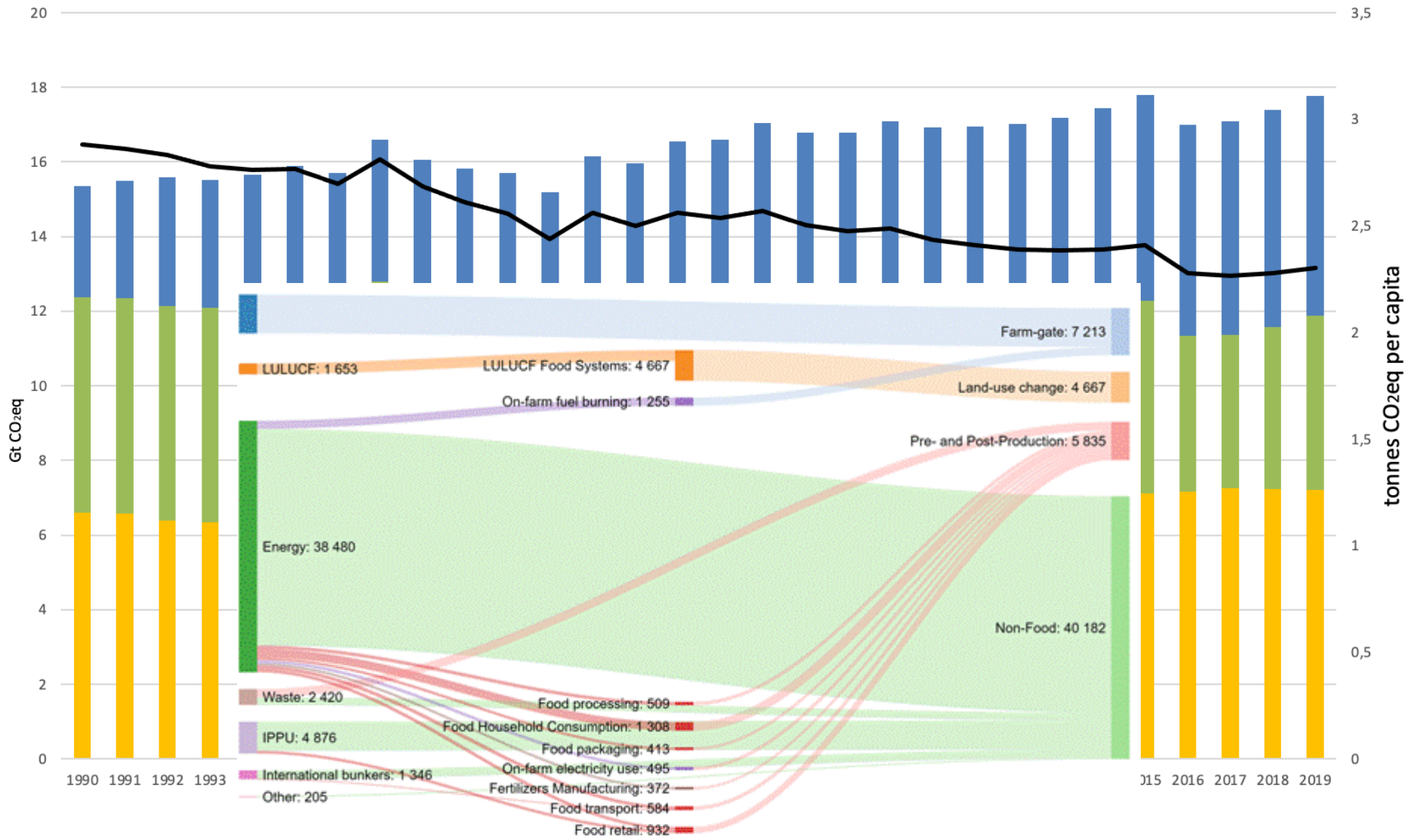
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FAOSTAT Emissions Shares Domain stats




	Emissions and Shares
Greenhouse gas	CO ₂ ; N ₂ O; CH ₄ ; F-gases
Spatial Coverage	194 Countries and 36 Territories
Temporal Coverage	1990-2019
Thematic Coverage	All IPCC sectors, all food system processes

GLOBAL HIGHLIGHTS

Emissions from food systems



Food Systems shares by gas, 2019

Food Systems View	CO2	CH4	N2O	CO2eq
 Farm gate	3%	38%	71%	13%
 Land use change	10%	4%	2%	9%
 Pre- and post-production	10%	14%	7%	11%
GRAND TOTAL	23%	56%	80%	33%

Annex I and Non-annex I emissions and shares

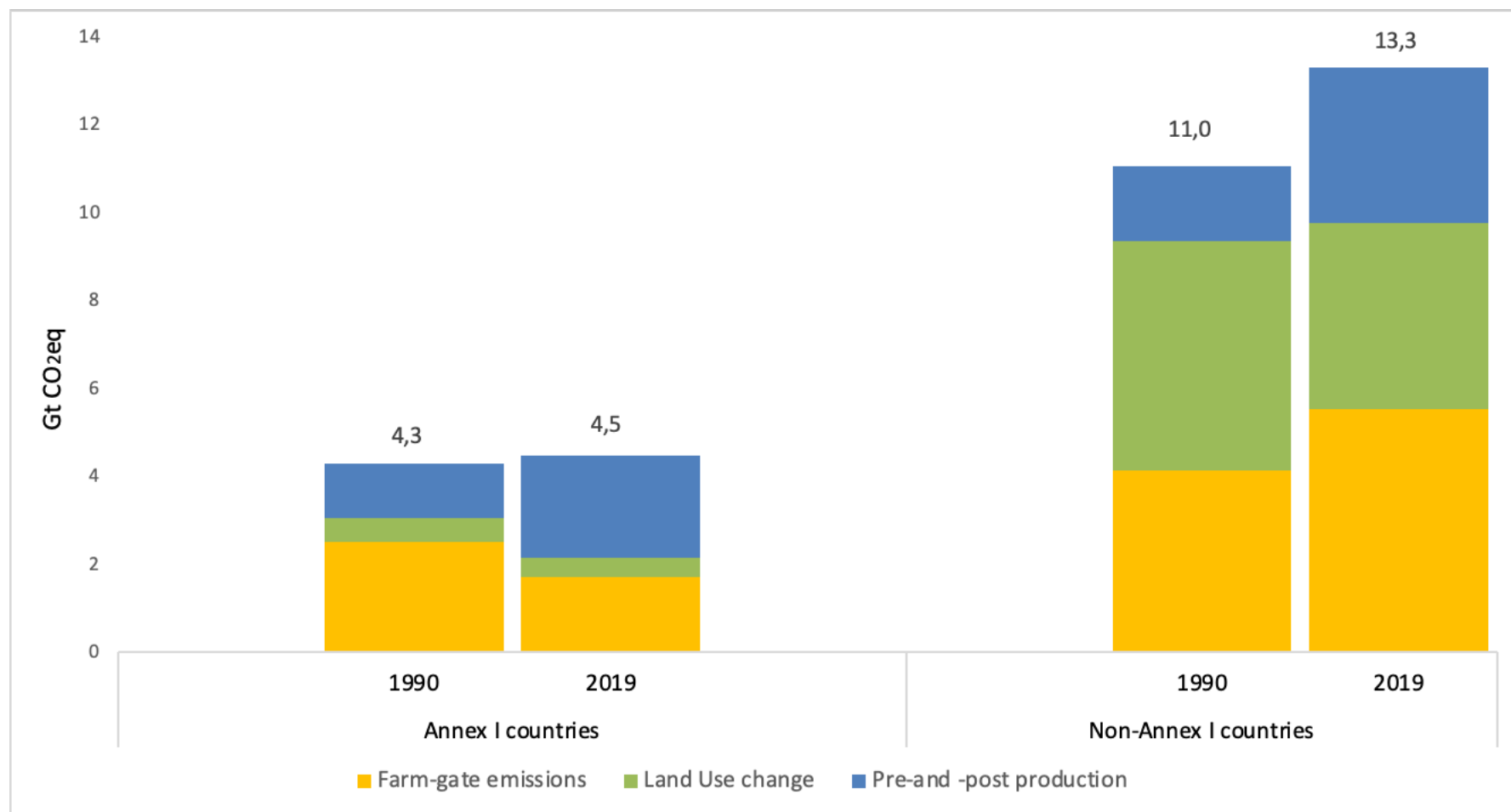
Food shares:

24%

27%

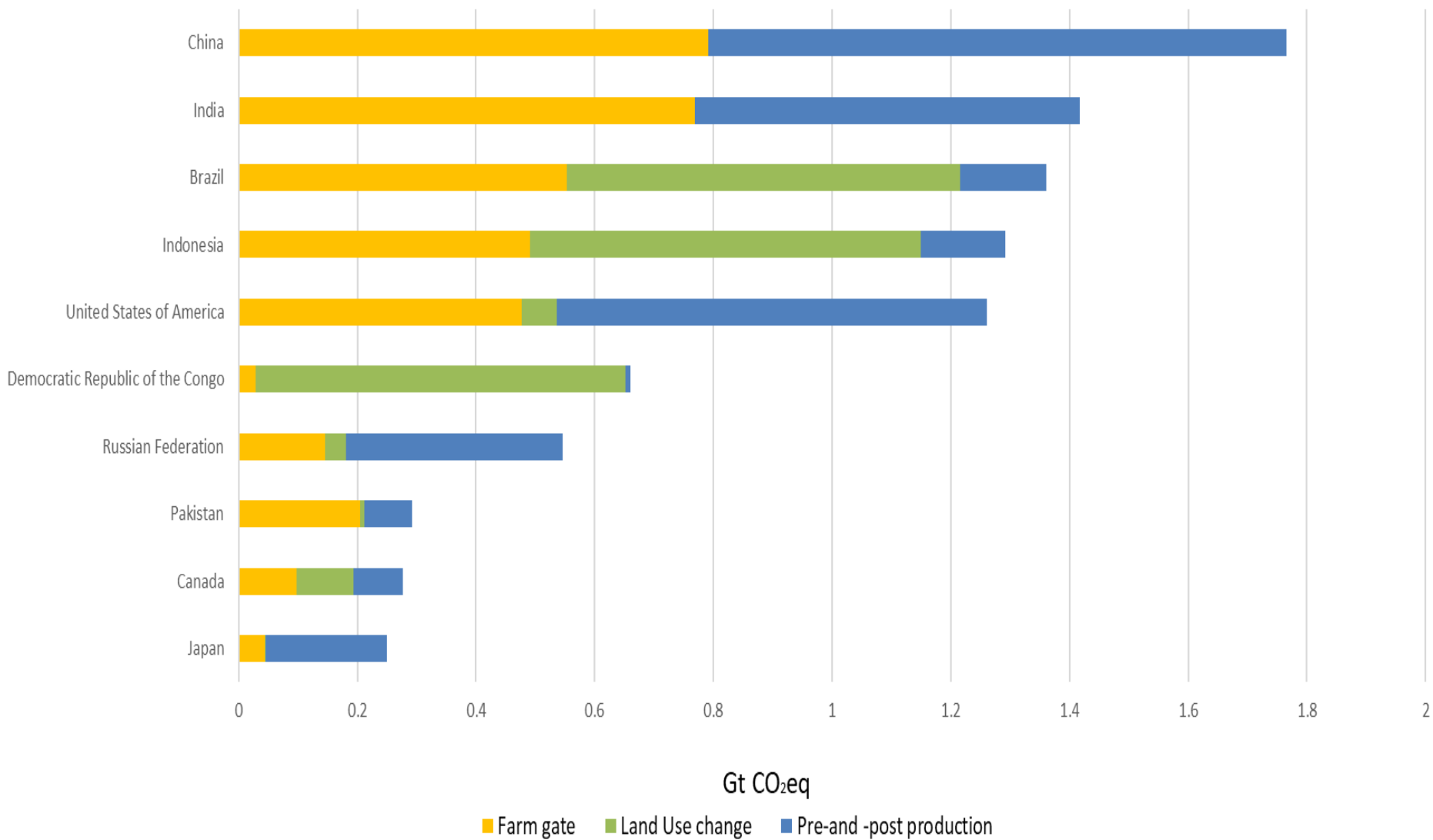
60%

40%

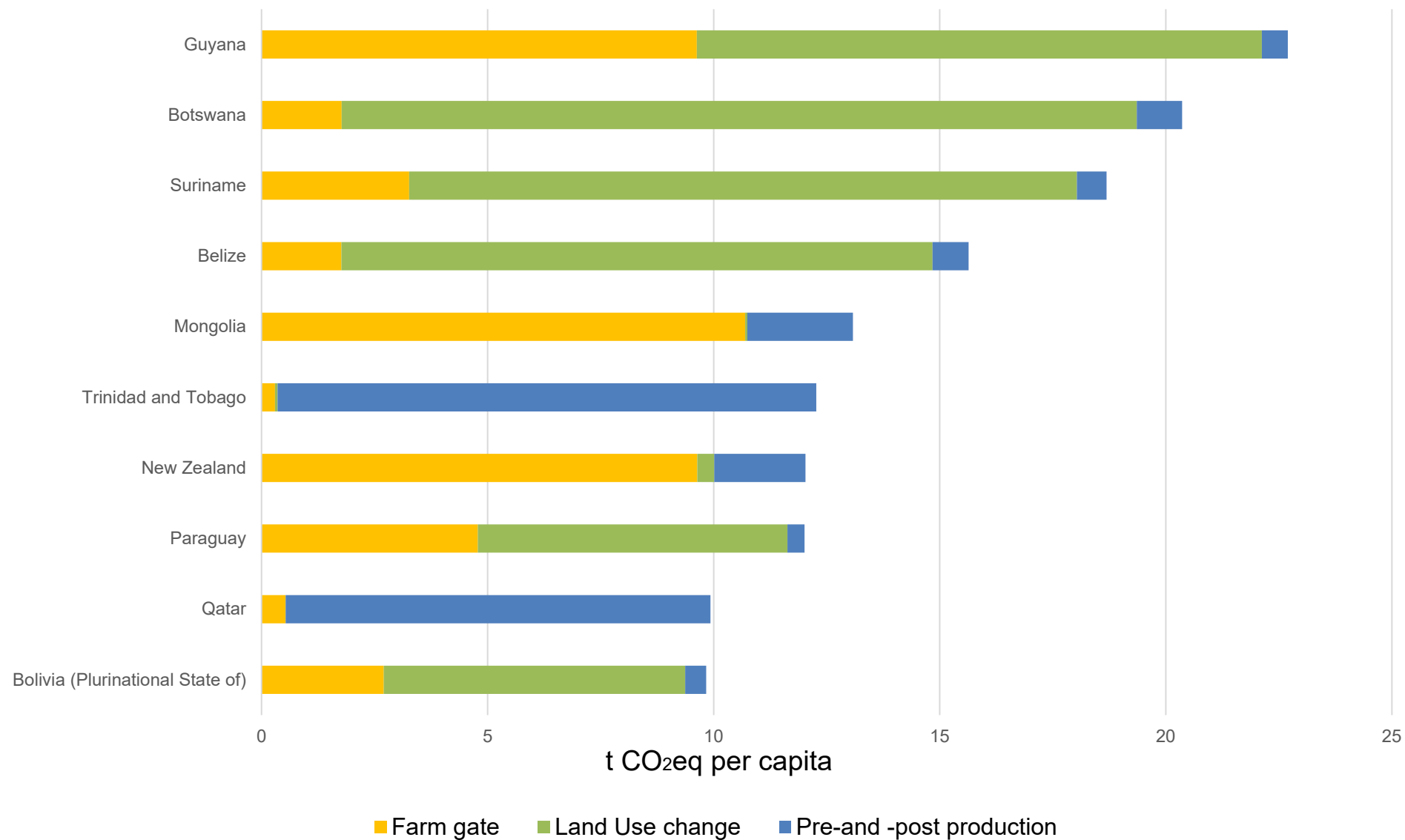


COUNTRY HIGHLIGHTS

Top ten countries food systems emissions, 2019



Top ten countries food emissions per capita, 2019



Conclusions

- Large share of emissions, but also large expected negative impacts, make food systems a critical component of climate actions by countries
- Granular data over time and at country level, help highlight hotspots for intervention, including within National Determined Contributions

Thank you!

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Emission shares domain: Structure

IPCC Emission Sectors

FAOSTAT-Food Systems



Agriculture



LULUCF



Energy



Industry



Waste

NGHGI	IPCC	FAO	OTHER LAND
LULUCF	Wetlands, Settlements and Other Land		OTHER LAND
	Forest Land	Forestland	FOREST LAND
	Burning Biomass	Fires, Other Forest Fires, Humid Tropical Forest Fires, Organic soils	LAND USE CHANGE
	Forest land converted to cropland and grassland	Net Forest Conversion	
	Drained Organic Soils	Drained Organic Soils	FARM GATE AGRICULTURE
	Cultivation of Histosols		
	Inorganic N fertilizers	Synthetic Fertilizers	
	Crop Residues	Crop Residues	
	Manure deposited on pasture, range and paddock	Manure Left on Pasture	
	Manure Applied to Soils	Manure Applied to Soils	
Manure Management	Manure Management		
Enteric Fermentation	Enteric Fermentation		
Prescribed burning of savanna	Savanna fires		
Burning-Crop residues	Burning-Crop residues		
Rice Cultivation	Rice Cultivation		
Liming; Urea application			
ENERGY		On-farm Energy Use	



Farm gate



Land use change



Processing



Food transport



Retail



Household



Fertilizer manufacturing



Packaging

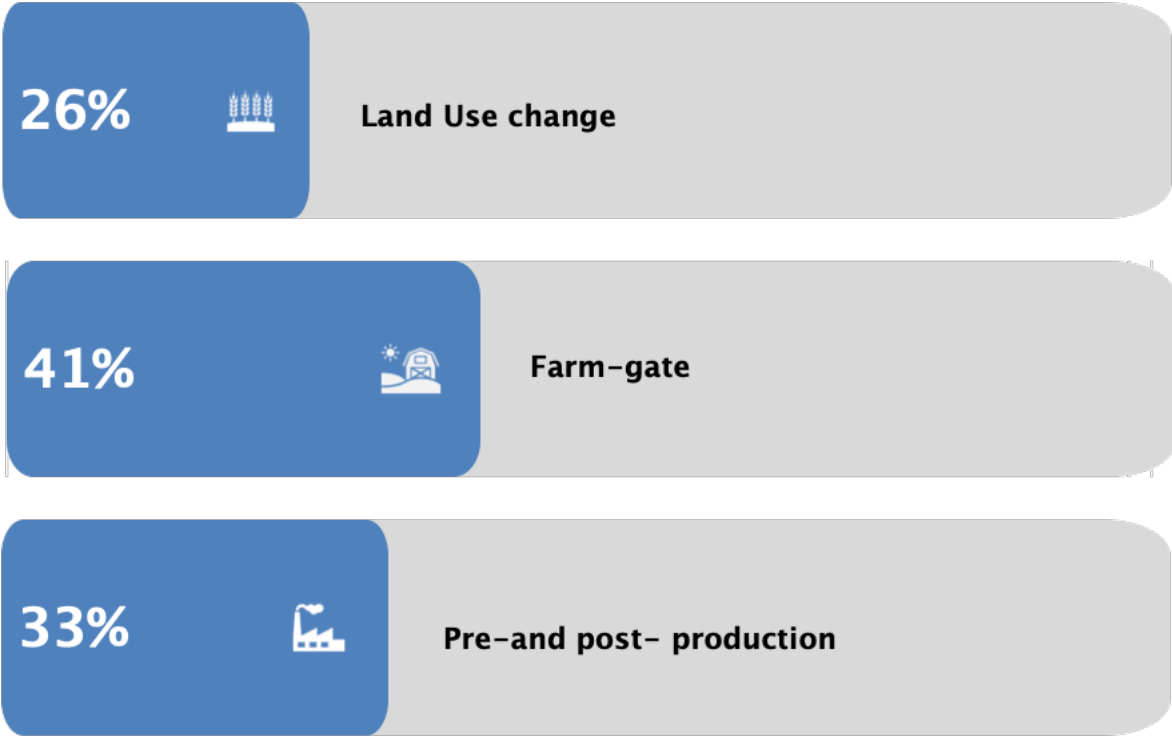


Waste disposal

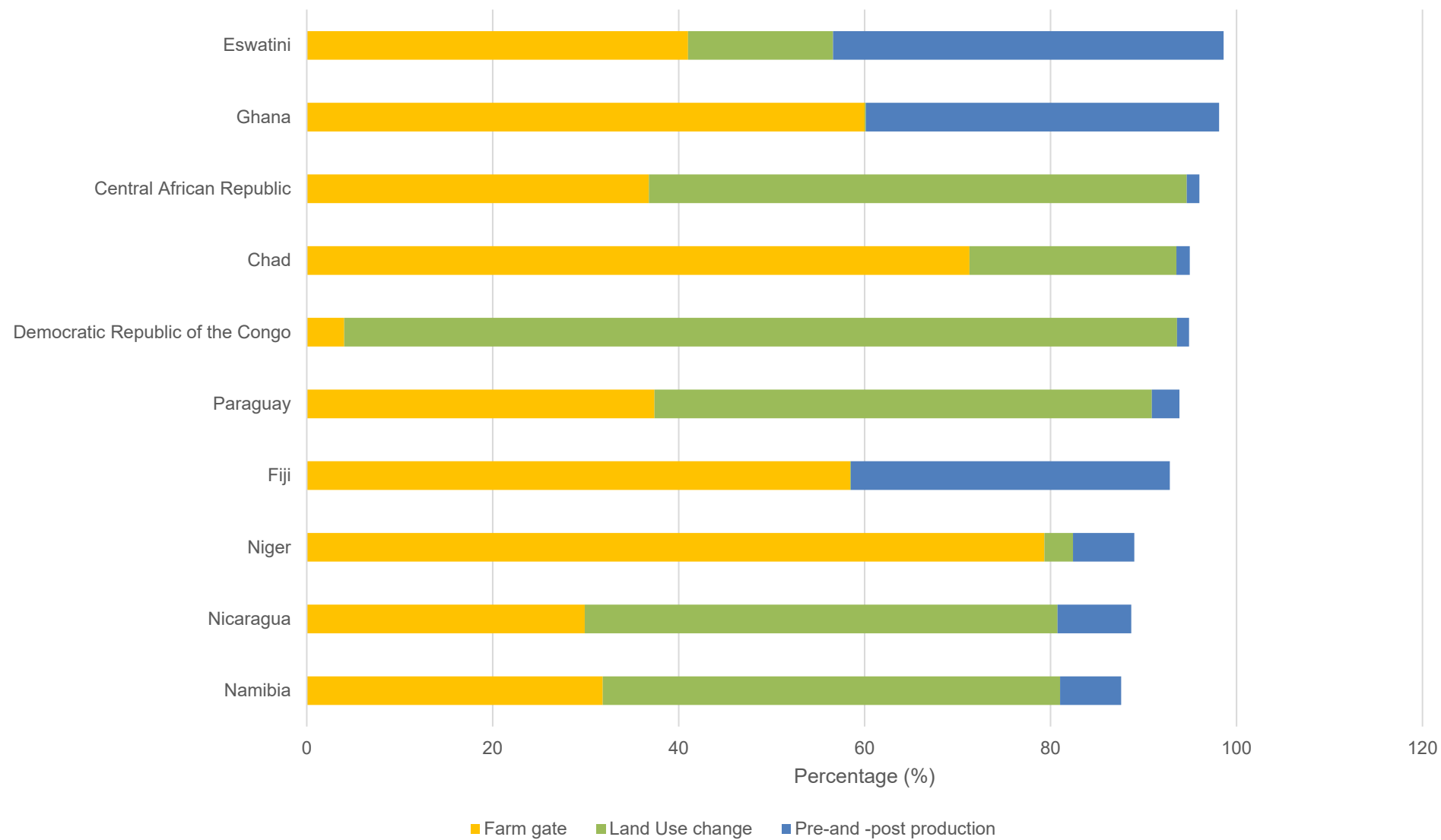


Pre- and post-production

Contributions to food systems emissions, 2019



Top ten countries food emissions shares, 2019



Regional trends in emissions shares, 1990-2019

