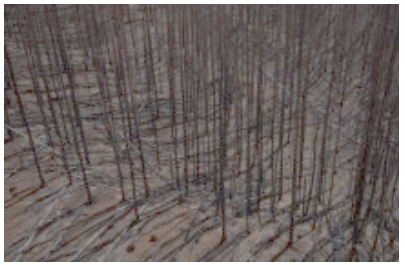
ALIMENTAR LA METRÒPOLI EN TEMPS D'EMERGÈNCIES

Reflexions sobre el rol de la producció i el consum de carn en la crisi climàtica

MARTA G. RIVERA FERRE

IPCC
INTERGOVERNMENTAL PANEL ON climate change

Chair Agroecology and Food Systems for Social Transformation



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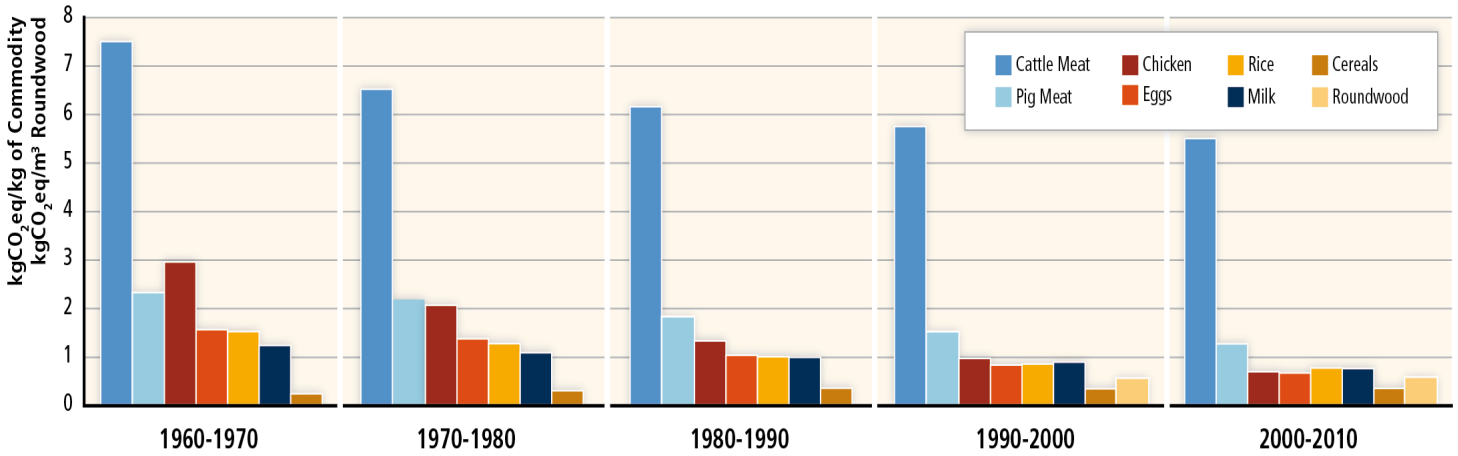

Smith *et al.* (2014) – IPCC WGIII AR5

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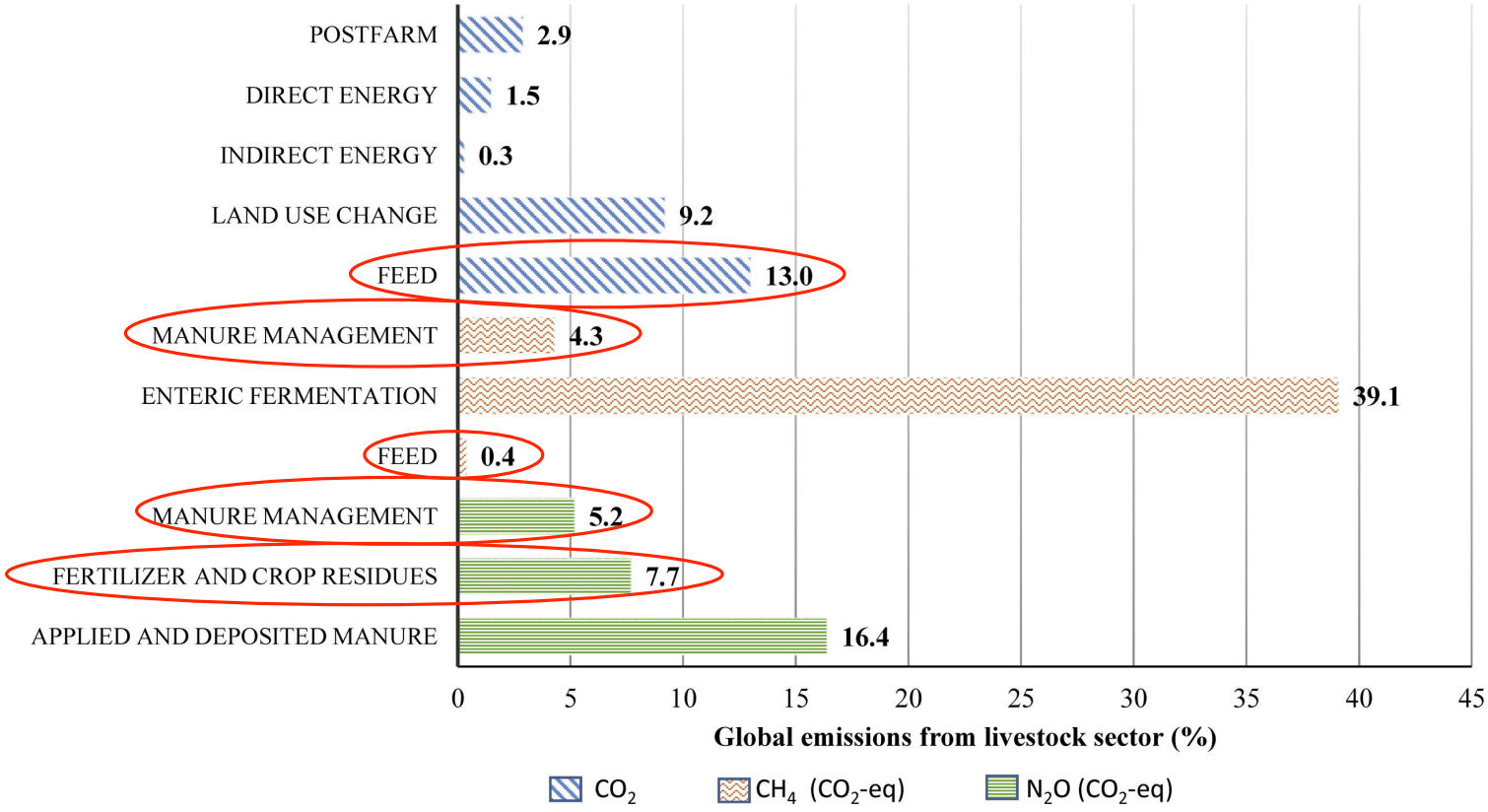
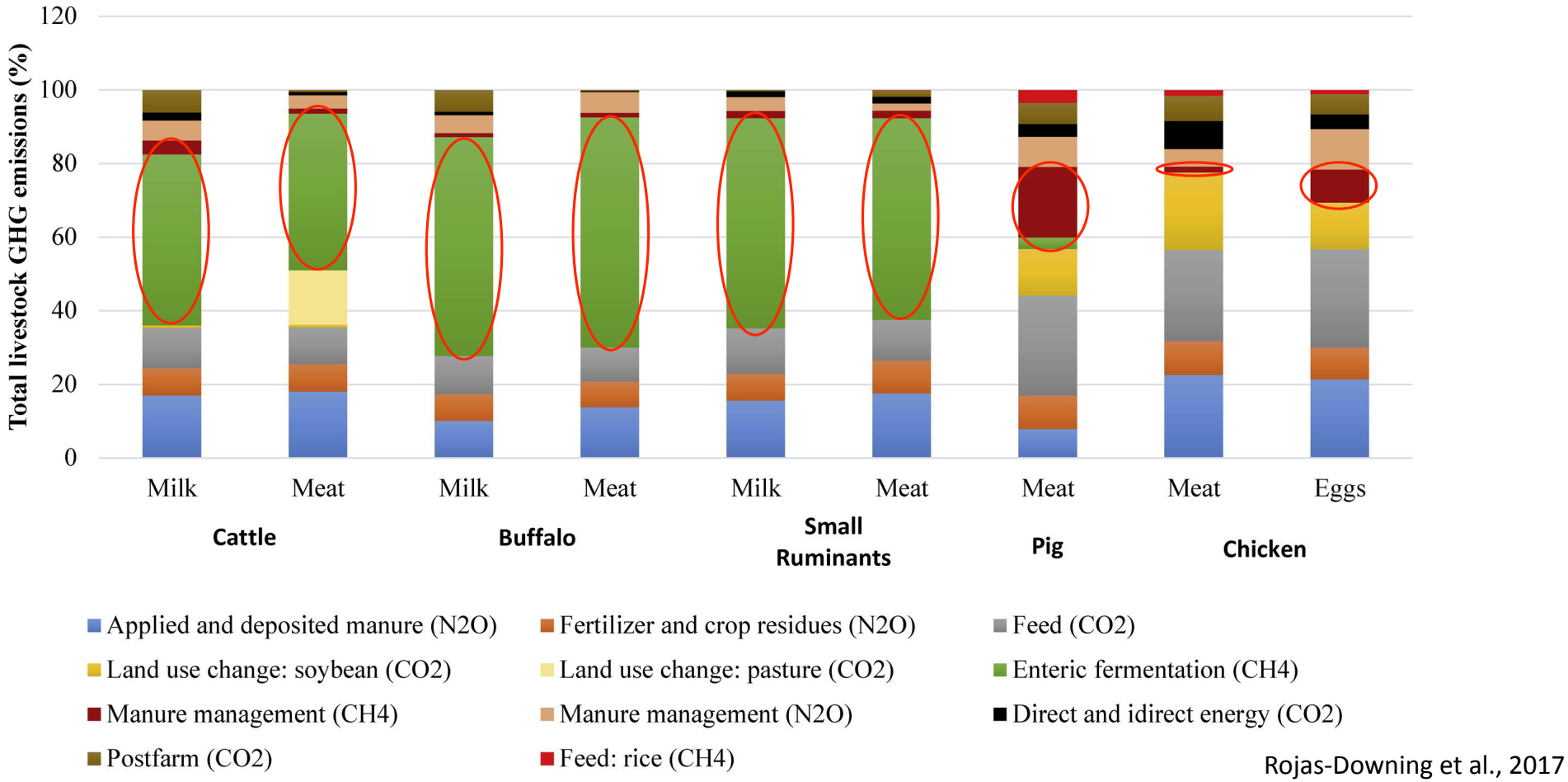
Bill Gates warns of the dangers of cow farts — and the world should take his words seriously

Julie Bort, Business Insider 12 Feb 2019 14:53h.



Actividades vinculadas a la **Producción piensos** contribuyen en un 45% del total emisiones GEI: LU, manejo purines, fertilizntes sintéticos, procesado y transporte

Gerber et al., 2013; Rojas-Downing et al., 2017



Rojas-Downing et al., 2017

Water	Measure of water use	Grazing	Intensive
		Liters day^{-1} per animal at 15°C	
Cattle	Drinking water: all	22	103
	Service water: beef	5	11
	Service water: dairy	5	22
Pigs (lactating adult)	Drinking water	17	17
	Service water	25	125
Sheep (lactating adult)	Drinking water	9	9
	Service water	5	5
Chicken (broiler and layer)	Drinking water	1.3–1.8	1.3–1.8
	Service water	0.09–0.15	0.09–0.15
Feed required to produce 1 kg of meat		**kg of cereal per animal**	
Cattle		–	8
Pigs		–	4
Chicken (broiler)		–	1
Methane emissions from cattle		**kg of CH_4 per animal year^{-1}**	
Cattle: dairy (U.S., Europe)		–	117–128
Cattle: beef, dairy (U.S., Europe)		53–60	–
Cattle: dairy (Africa, India)		–	45–58
Cattle: grazing (Africa, India)		27–31	–

Godfray et al., 2010

	Grazing System	Mixed Crop-Livestock System	Industrial System
GHG emissions (examples)	27–31 kg of CH_4 per animal per year in grazing cattle in Africa and India[46] 12% total non-CO_2 emissions[40]	53–60 kg of CH_4 per animal per year in beef & dairy cattle in USA and Europe; 45–58 kg of CH_4 per animal per year in dairy cattle in Africa and India.[46] 77% emissions from cattle (not all mixed crop-livestock)[40]	117–128 kg of CH_4 per animal per year in dairy cattle in USA and Europe[46] 10% total non-CO_2 emissions from monogastric (not all industrial)[40]
GHG emission metrics giving the most favorable outcome	Area (kg CO_2eq/area of land); resource based (kg CO_2eq/kg of fossil fuel based inputs; kg edible output/quantity of ecosystem services provided; kg CO_2eq. avoided by use of marginal land).[52]	Quantity based (e.g., kg CO_2eq./kg food and non-food goods—leather, wool, manure, traction, etc.)[52]	Quantity based (e.g., kg CO_2eq/kg produce)[52]
Mitigation assets	Grazing responsive to environmental variation and low dependence on fossil-fuel-based practices and external inputs. Enhanced animal husbandry, GHG sequestration.	Maintenance of soil fertility, low dependence on fossil-fuel based practices and external inputs. Enhanced animal husbandry and herd/flock management, supplements, feed budgets.	Increased productivity and efficiency through better nutrition and genetics, adjusting the growing environment, animal health.

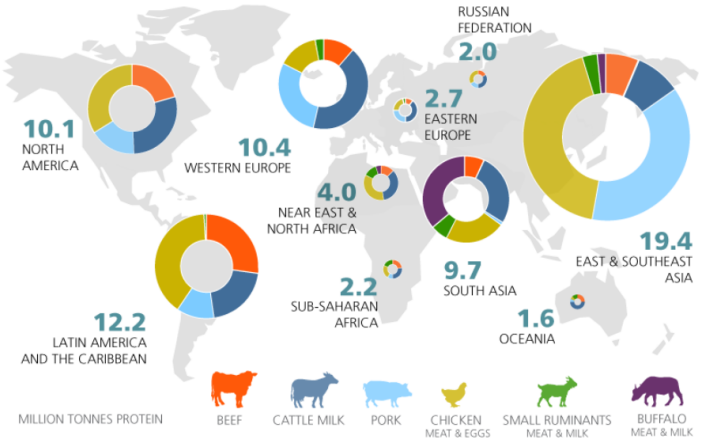
Rivera-Ferre et al., 2016

Reducciones de 26 - 43% en pequeño rumiante (Gutiérrez-Peña et al. 2019; Salvador et al. 2017; Batalla et al. 2015; Petersen et al. 2013).

Necesidad de enfoque holístico en relación a producción/productividad por GEI que sea sensible a las necesidades (conservación recursos naturales, nutrición, competición con alimentos/tierras, etc.)

	Comments
Quantity based	
kg CO_2 eq/kg product	Mainstream metric – favours intensive monogastric production
kg CO_2 eq/kg protein, iron, calcium, fatty acid profile and so forth	Depends on nutrient: iron and calcium metric may favour ruminants; grass-fed ruminants may have better Omega 3–6 ratios than cereal fed animals (Aurousseau et al., 2004; Demirel et al., 2006); protein as metric will favour intensive monogastrics
kg CO_2 eq/kg food and non-food goods provided (leather, wool, feathers, dung, traction)	Variable; on balance likely to favour ruminants
Area based	
kg CO_2 eq per area of land	Emissions lower for extensive systems and for monogastrics
kg CO_2 eq per area of prime arable land required	Emissions lower for extensive systems, both ruminant and monogastric
Resources based	
kg CO_2 eq/kg of fossil fuel based inputs	Emissions lower for extensive systems, both ruminant and monogastric
kg CO_2 eq avoided through use of byproducts or poor quality land to rear livestock; this approach quantifies the GHG and land opportunity cost of needing to obtain an equivalent quantity of nutrition from elsewhere	Favours extensive systems and particularly landless household pig and poultry reliant on scraps
kg edible output per given quantity of ecosystem services provided on farmed land	Favours extensive ruminant systems
kg edible output per given area of land 'spared' for conservation or biomass production	Favours intensive systems, especially monogastrics

Garnett, 2010



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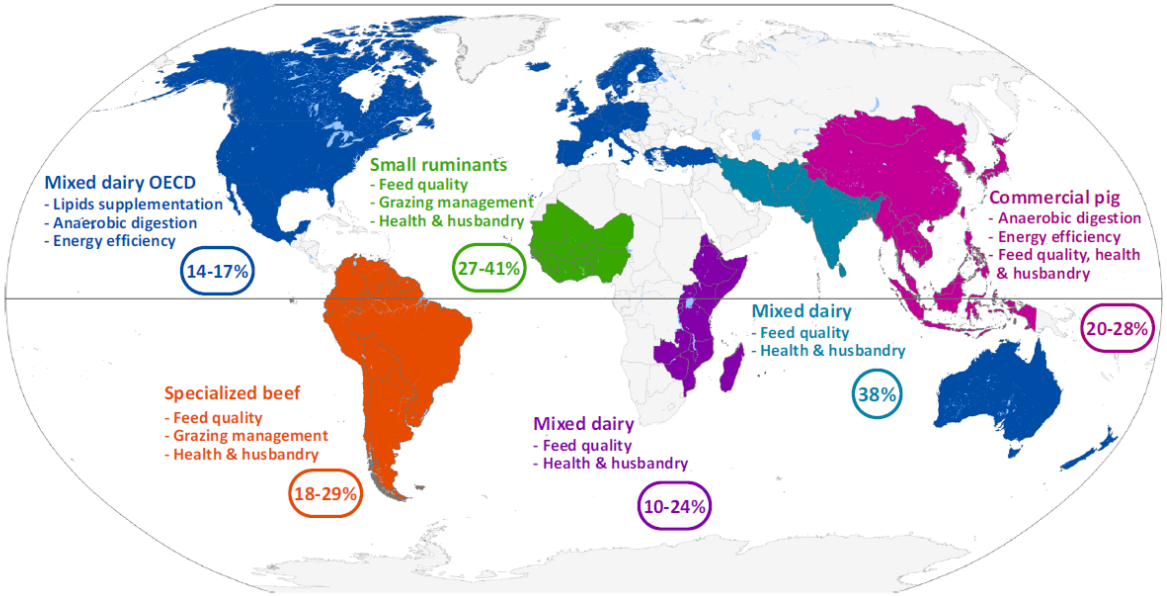
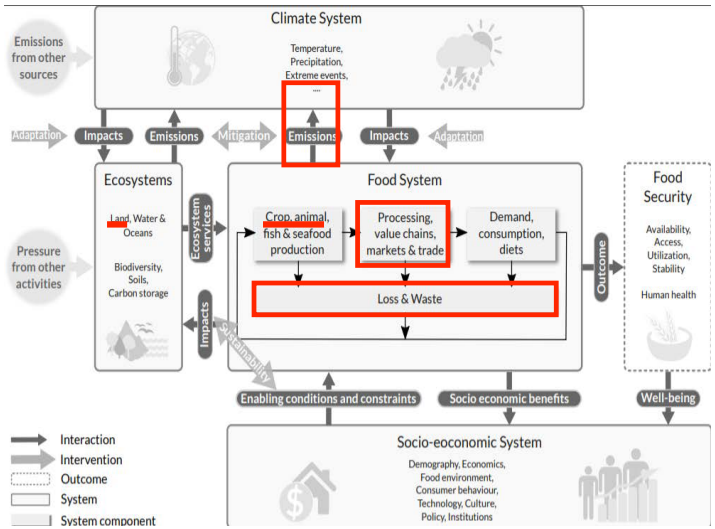


Mottet et al., 2016

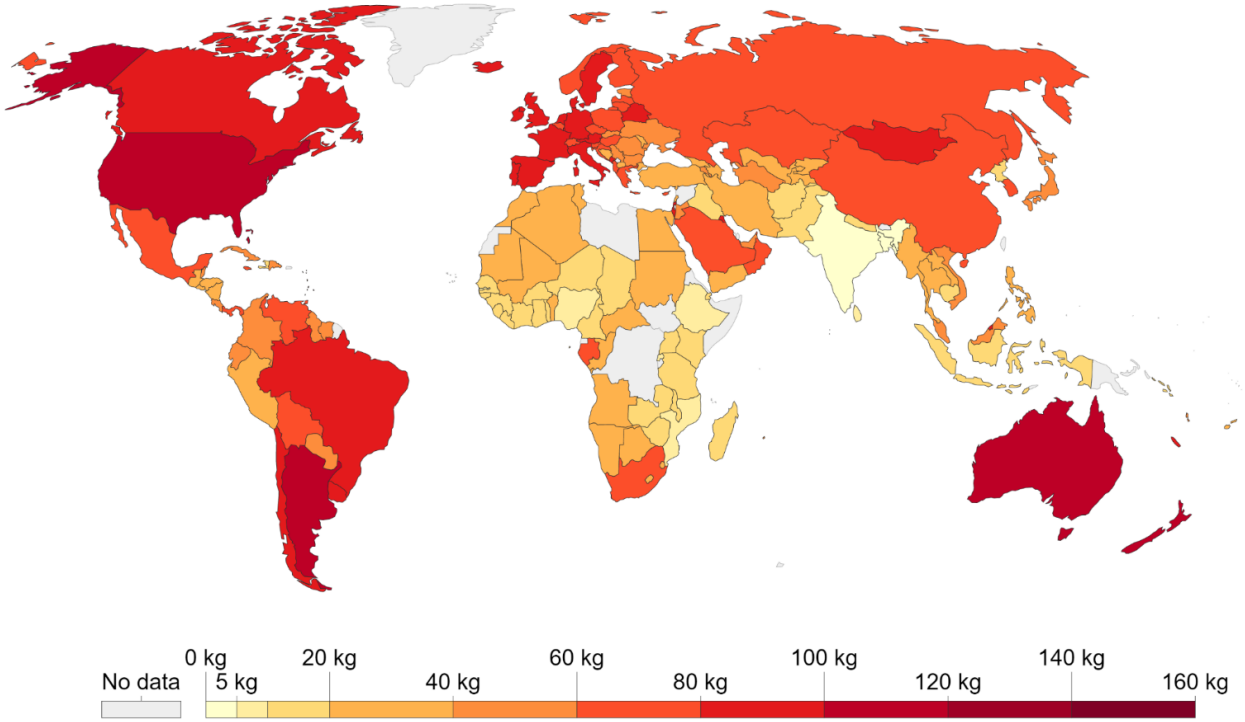


- Emisiones arriba (alimentación animal y fertilizantes) y abajo (transporte, refrigeración) en producción ganadera intensiva contribuyen en 24–32% del total emisiones ganadería, ≈40% de la energía, 60% LU (Weiss & Leip 2012)
- La proporción emisiones arriba/abajo caen de manera significativa en los sistemas menos intensivos y más localizados
- En 2009, el desperdicio alimentario (loss & waste) de leche, pollo, cerdo, ovino y patatas supusieron el 3% del total de emisiones globales de N_2O de la agricultura (> 200 Gg N_2O-N yr^{-1} or 0.06 Gt CO2-eq yr^{-1}) (Reay et al. 2012).

Meat supply per person, 2013

Average total meat supply per person measured in kilograms per year. Note that these figures do not correct for waste at the household/consumption level so may not directly reflect the quantity of food finally consumed by a given individual.

Our World in Data



Source: UN Food and Agriculture Organization (FAO)
Note: Data excludes fish and other seafood sources

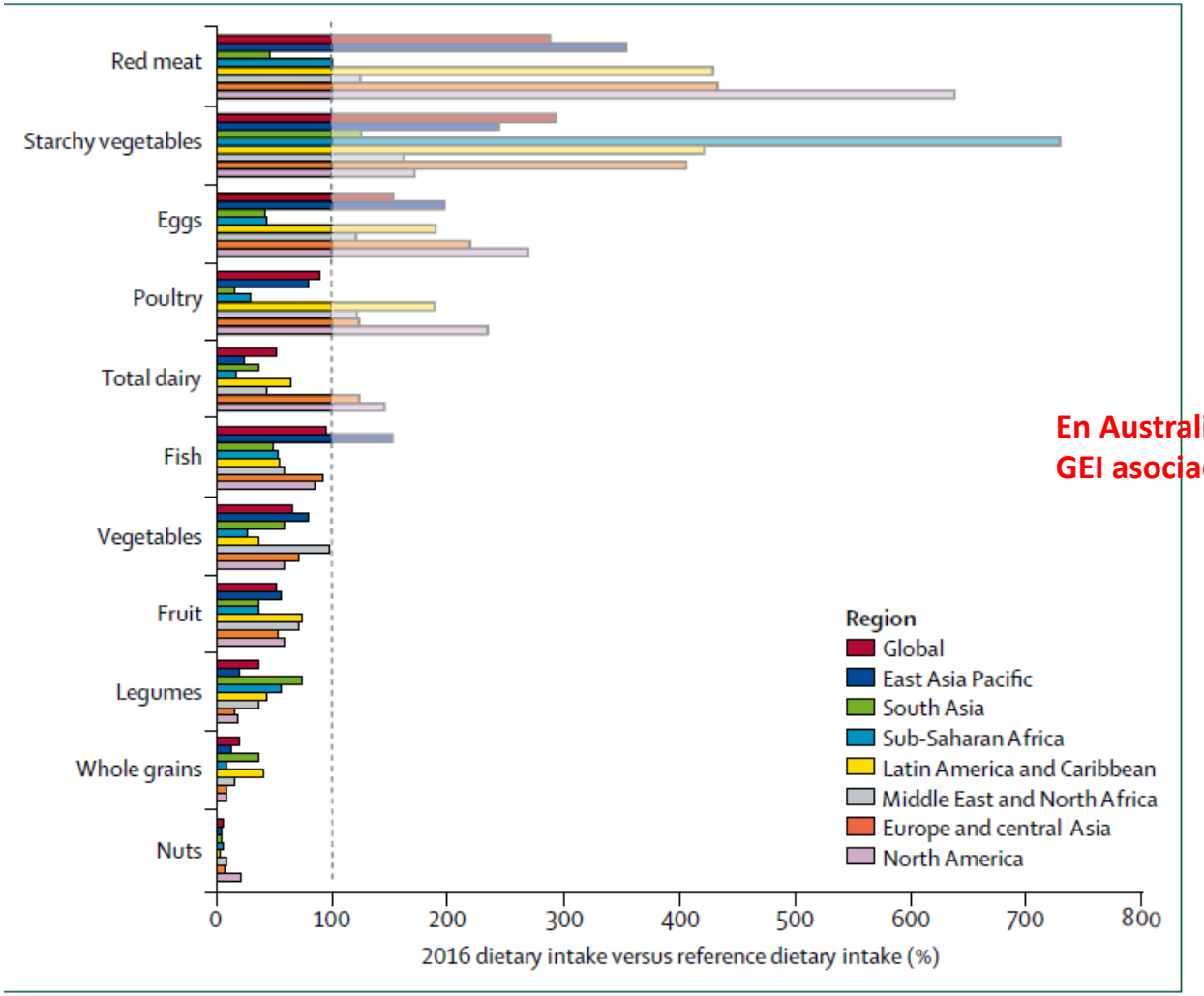
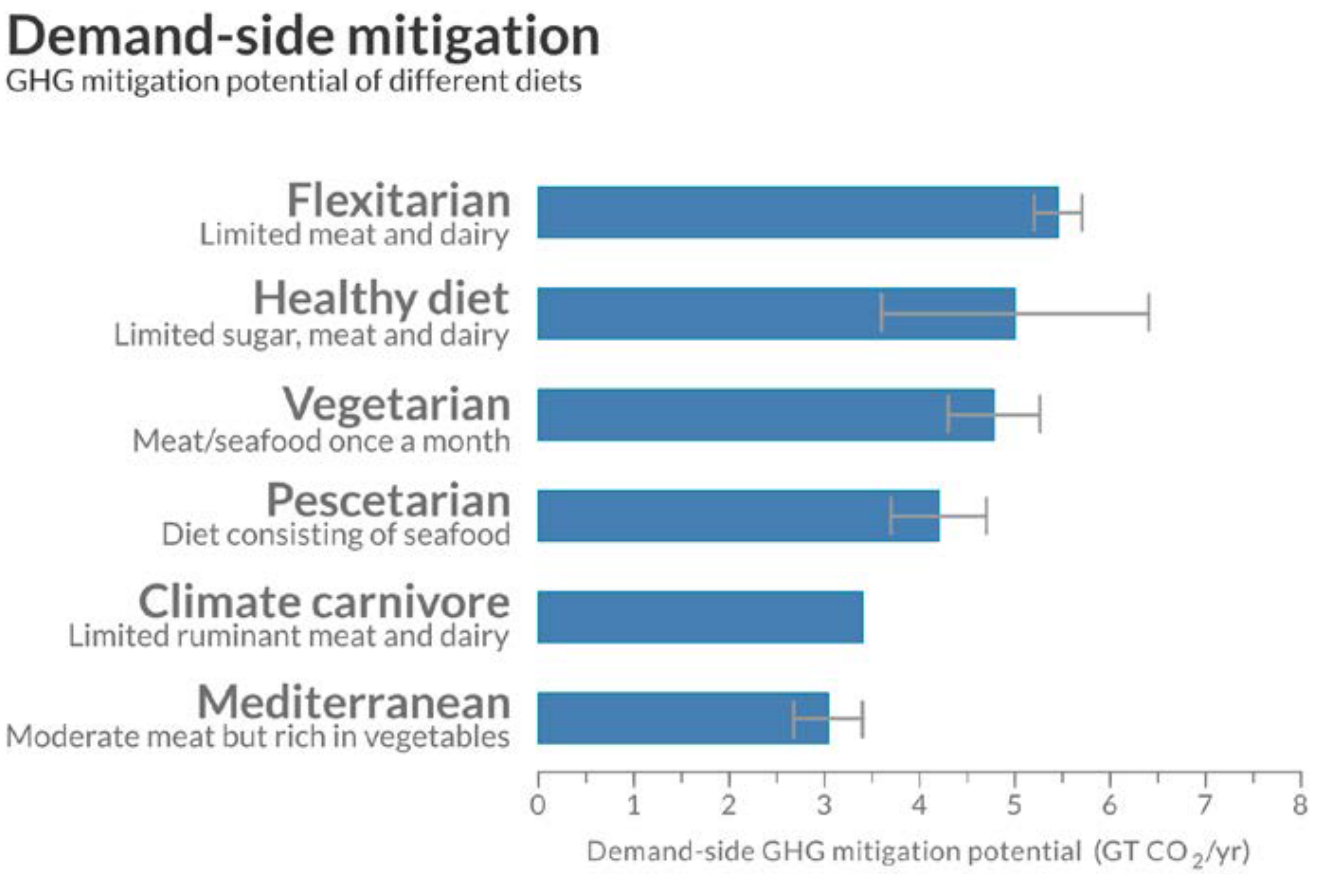


Figure 1: **Diet gap between dietary patterns in 2016 and reference diet intakes of food**
Data on 2016 intakes are from the Global Burden of Disease database.[130] The dotted line represents intakes in reference diet (table 1).

En Australia el sobreconsumo supone e torno al 33% GEI asociadas a los alimentos (Hadjikakou 2017)

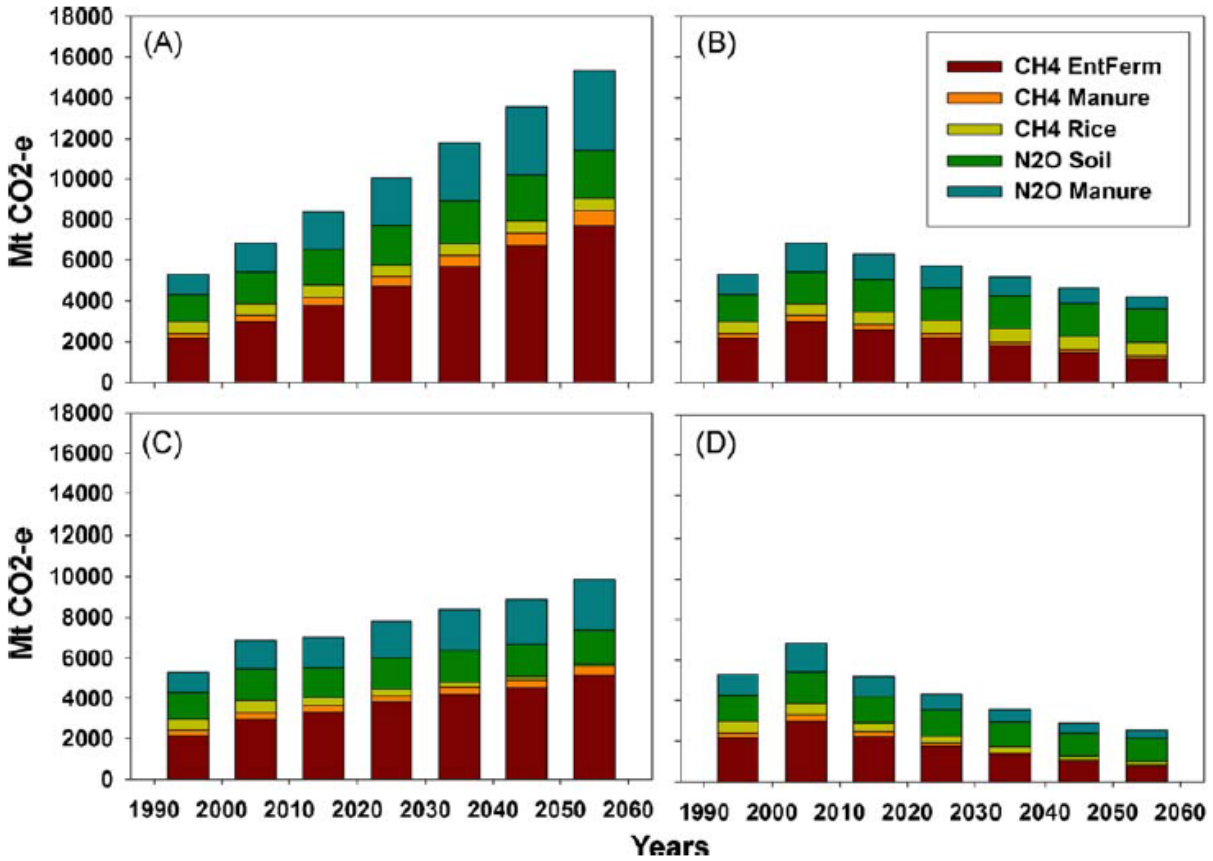
The Lancet, 2019



Mbow et al., 2019

Menos productos animales en nuestra dieta permitiría alimentar a toda la población y destinar tierra para otros usos (energía, conservación, etc.)

Reducing GHG emissions: dietary change *vs*. technical mitigation



Without technical mitigation

With technical mitigation

Increased meat

Decreased meat

Popp *et al.* (2011)

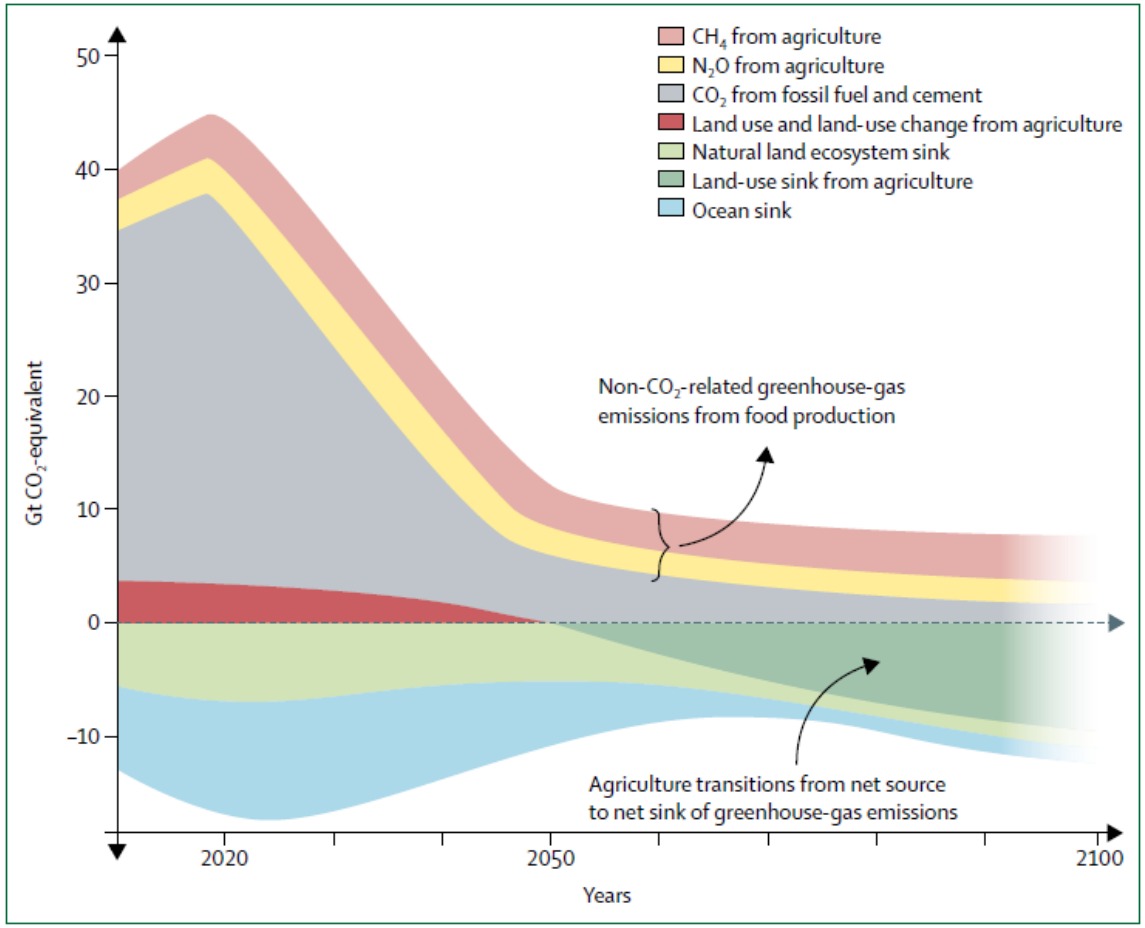


Figure 2: **Projections of global emissions to keep global warming to well below 2°C, aiming for 1·5°C**
Data are from Intergovernmental Panel on Climate Change fifth assessment report (RCP2.6 data for nitrous oxide and methane) and Rockström and colleagues[28] (for fossil-fuel emissions, land use, land-use change, and forestry, and biosphere carbon sinks).

The Lancet, 2019

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Merci!

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