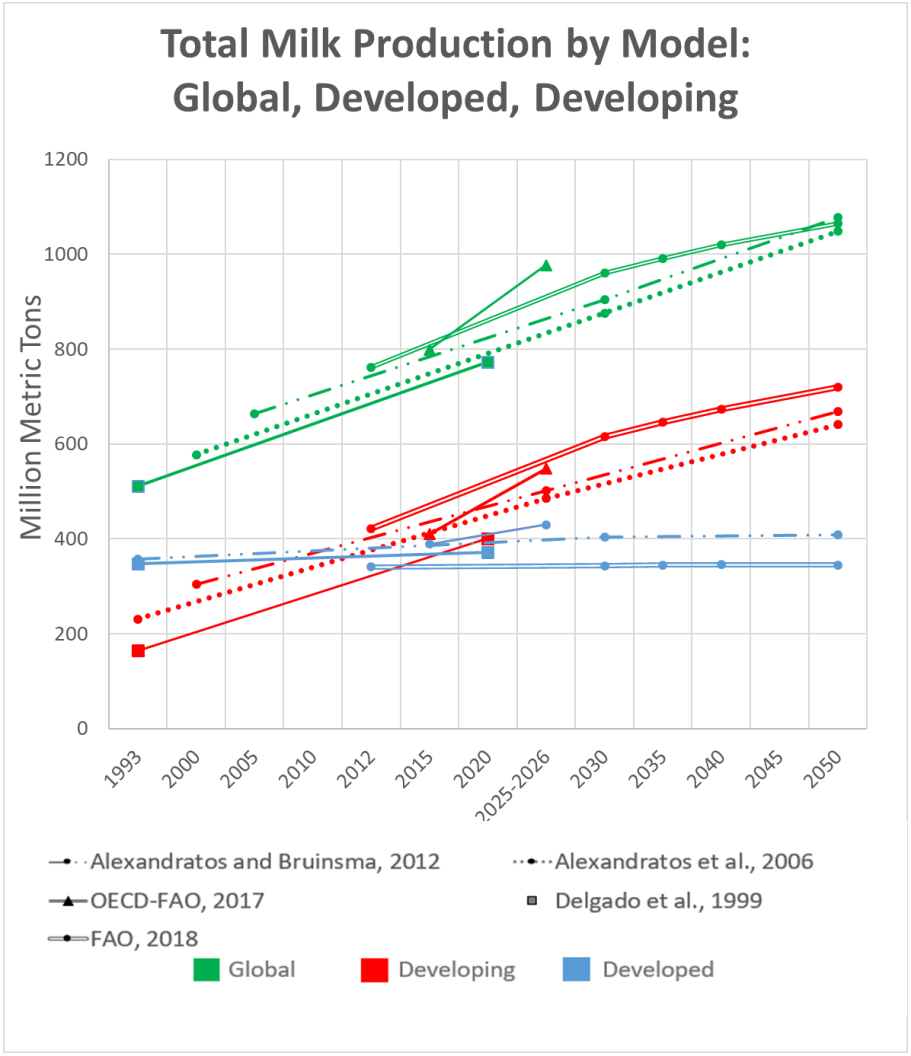
BALANCE PRODUCTION / CONSUMPTION
ANIMAL FARMING FOR HUMANS' WELL-BEING AND PLANETARY HEALTH

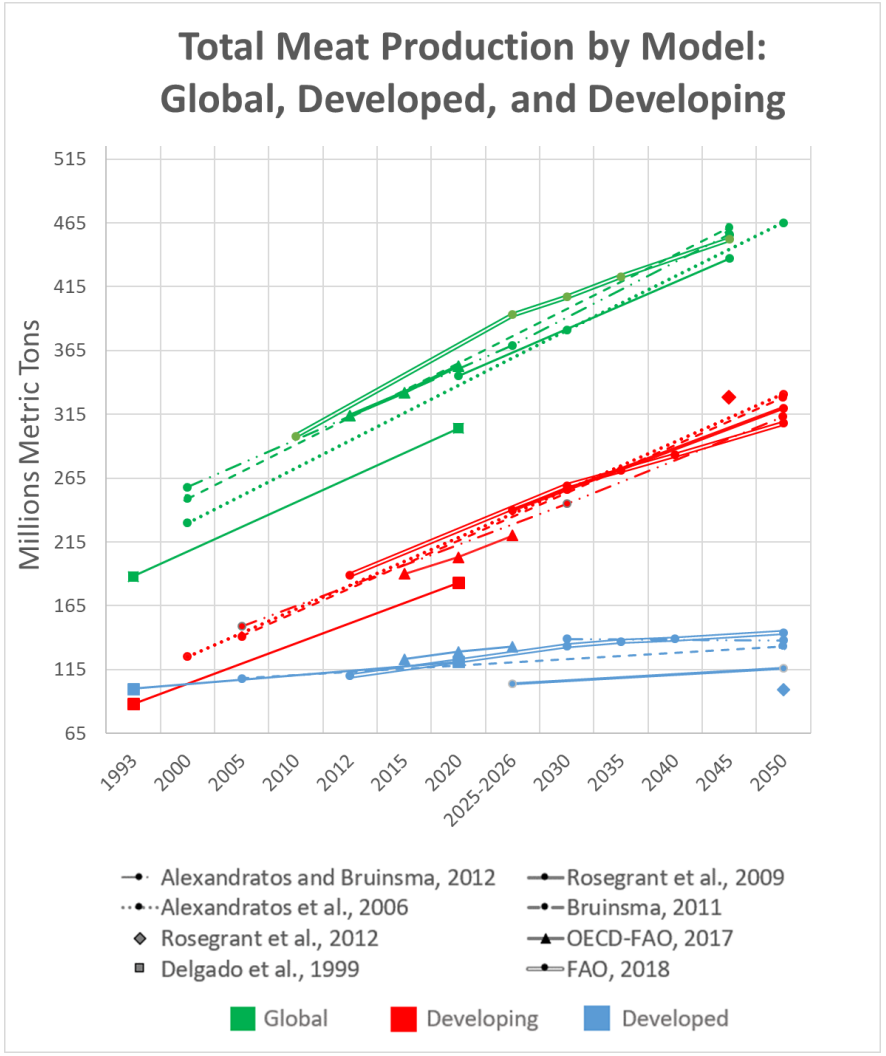
Observations at the global scale

November 7th, 2018 | Pierre Gerber

WAGENINGEN UNIVERSITY & RESEARCH

A GROWING SECTOR… HOW AND FOR HOW LONG?





WHAT SHAPES LIVESTOCK SYSTEMS TODAY?

Changing society's expectations

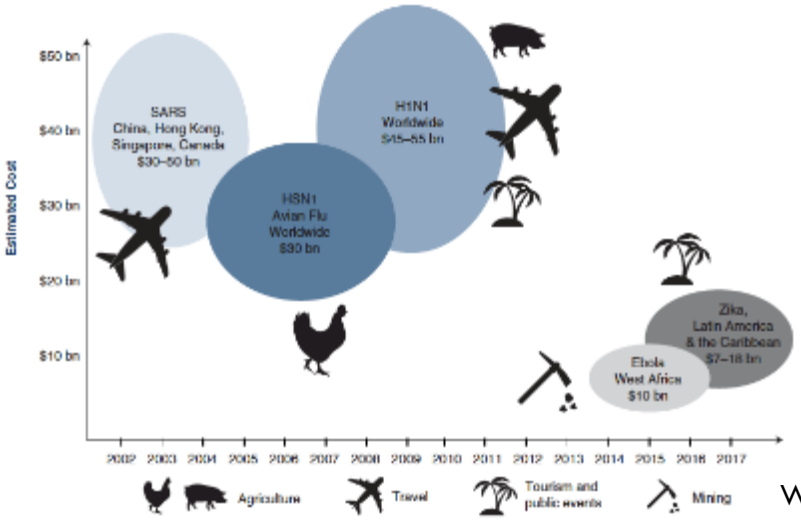
Changing technologies

Changing resources

A GLOBALIZING ENTERPRISE

- About 15% of meat, milk and eggs globally traded
- About 40% of soybean

Trade

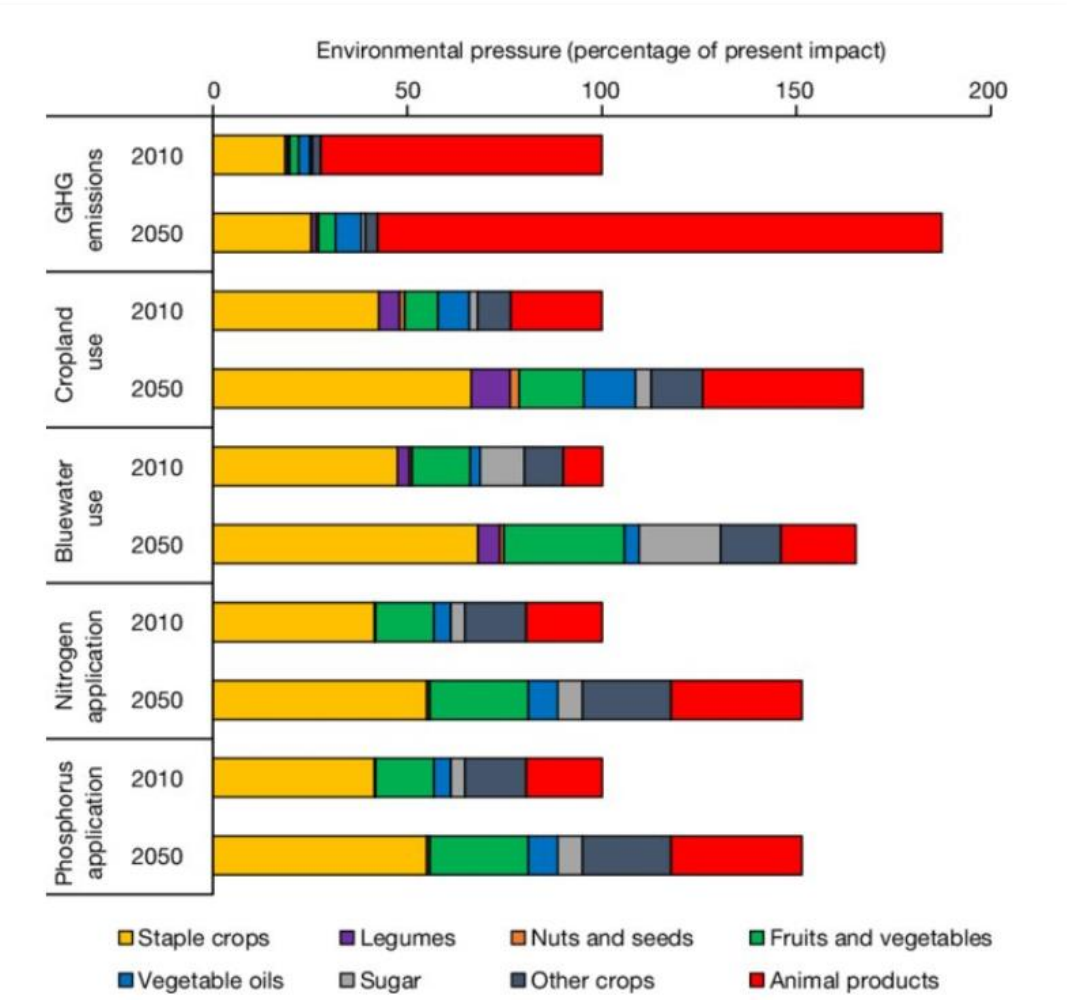


World bank, 2018

Pandemic diseases

Technologies

A SIGNIFICANT CONTRIBUTION TO GLOBAL ENVIRONMENTAL ISSUES



Springmann et al., 2018

AND THERE ARE OTHER ISSUES TOO

- Animal welfare
- Labor conditions
- Anti-microbial resistance
- Inequalities and poverty
- Economic growth and trade balances
- …

Three sustainability fairytales

MS. HEN, THE EFFICIENT

Albert Anker, 1884

I HAVE DONE IT IN MANY COUNTRIES, LET'S DO IT EVERYWHERE !

LCA for acidifying, eutrophying, and GHG emissions, and cumulative energy demand (CED) for 1,000 pullets and 1 t of eggs produced in the USA

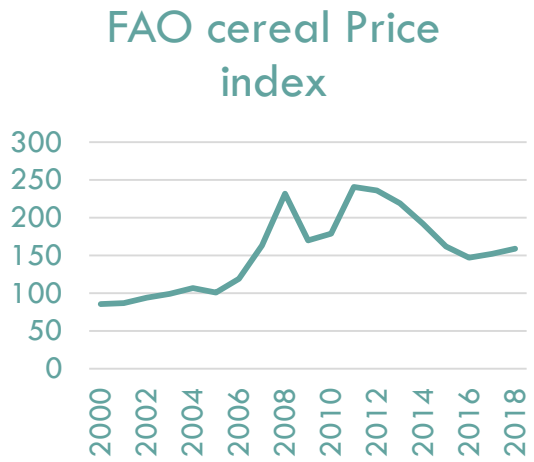
	Acidifying emissions (kg of SO_2-e)		Eutrophying emissions (kg of PO_4-e)		GHG emissions (kg of CO_2-e)		CED (MJ)	
Item	Pullets	Eggs	Pullets	Eggs	Pullets	Eggs	Pullets	Eggs
Year								
1960	390	200	129	70	13,458	7,230	45	18
2010	196	70	54	20	5,404	2,080	41	12
Reduction (%)	50	65	58	71	60	71	9	31

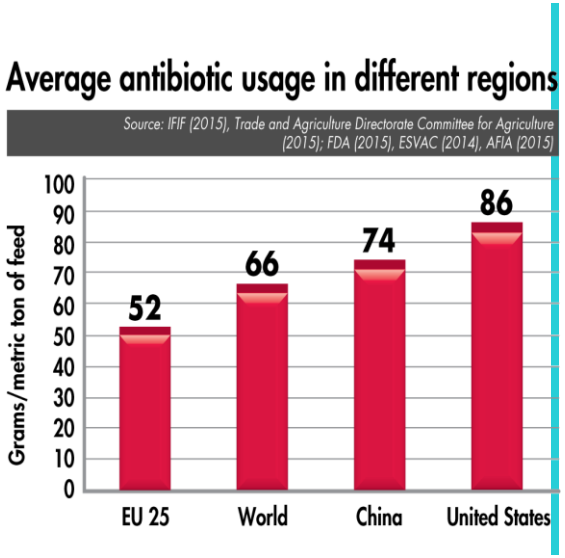
Pelletier et al., 2014

MS. HEN CAN HELP, BUT DOES NOT HAVE IT ALL, GLOBALLY

High quality feed means human edible feed

Industrialization associated with high levels of antimicrobial use, and poor labor conditions and animal welfare,





Natural resource use efficiency also results in low costs, thus in rapid consumption growth, and eventually in significant absolute impact

MORAL OF THE STORY

Volume matters

Disconnecting it from ecological cycles is hazardous

MR. PIG, ADEPT OF CIRCULAR ECONOMY

Pieter Buegel, 1556

JAPAN AND KOREA ARE DOING IT WITH SUCCESS. THE REPLICATION POTENTIAL IS HUGE !

Change in life-cycle-NUEN and N losses after substitution of grain and soybean by swill feed for industrial pork supply chains

Regions	Life-cycle-NUE_N			N losses in feed production		
	Baseline	Scenario	Change	Baseline	Scenario	Change
South Asia	42	54	29%	14	6	-53%
North America	69	71	3%	153	117	-24%
Western Europe	51	58	14%	1,107	741	-33%
ESEA[1]	50	58	16%	542	237	-56%
Eastern Europe	52	59	13%	166	108	-35%
Oceania	51	57	12%	18	12	-31%
LAC[2]	60	66	10%	128	64	-50%
Russian Federation	48	57	19%	87	41	-53%
Sub-Saharan Africa	39	41	5%	57	51	-11%
NENA[3]	52	60	15%	13	6	-49%
World	**67**	**74**	**10%**	**2,285**	**1,383**	**-39%**

Uwizeye et al., forthcoming

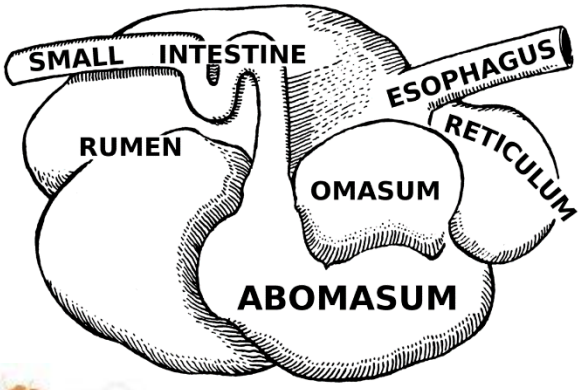
MR. PIG CAN MAKE A VALUABLE CONTRIBUTION TO FOOD SYSTEMS, BUT IT IS LIMITED

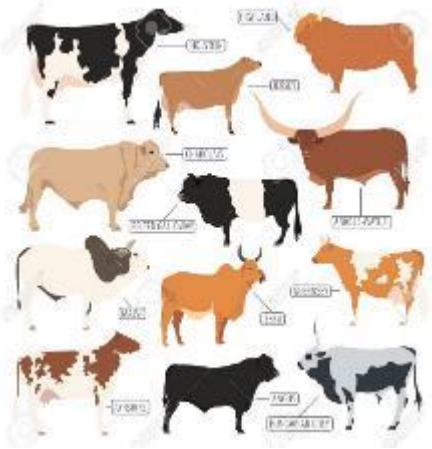
- Pigs feeding entirely on co-products and food waste could produce about 9-23 (14) g protein/person per day (Van Zanten et al., 2015)
- Volume of production constrained by input and output fluxes: production is limited and geographically unbalanced
- Need to carefully address public health issues

MORAL OF THE STORY

Integration requires balance

MS. CATTLE, THE NATURALIST

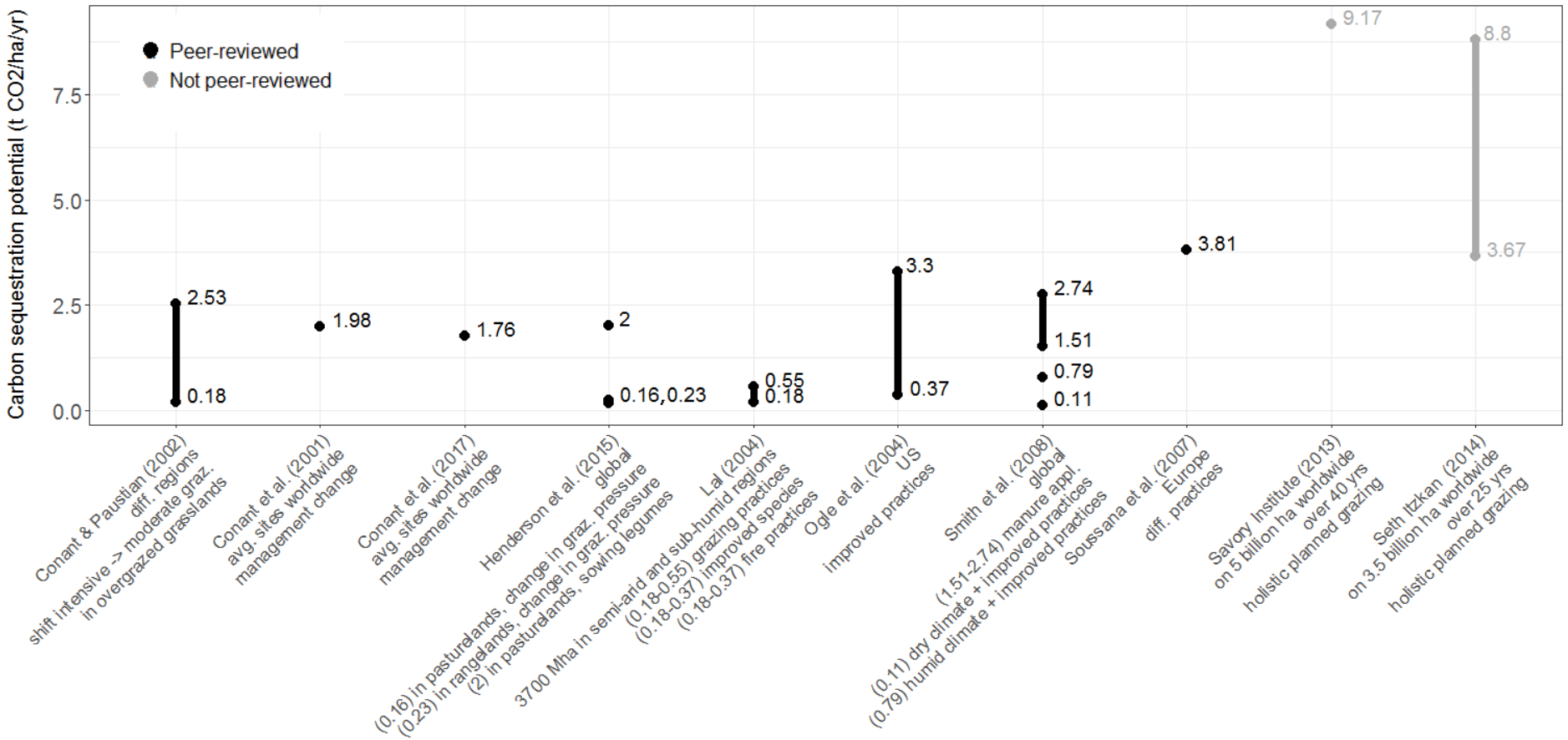




Andy Warhol, 1966

SOIL ORGANIC CARBON: NEGATIVE GHG EMISSIONS AND INDICATOR OF ECOSYSTEM HEALTH

Estimated annual soil carbon sequestration potential from grazing management, per hectare



Garnett et al., 2107

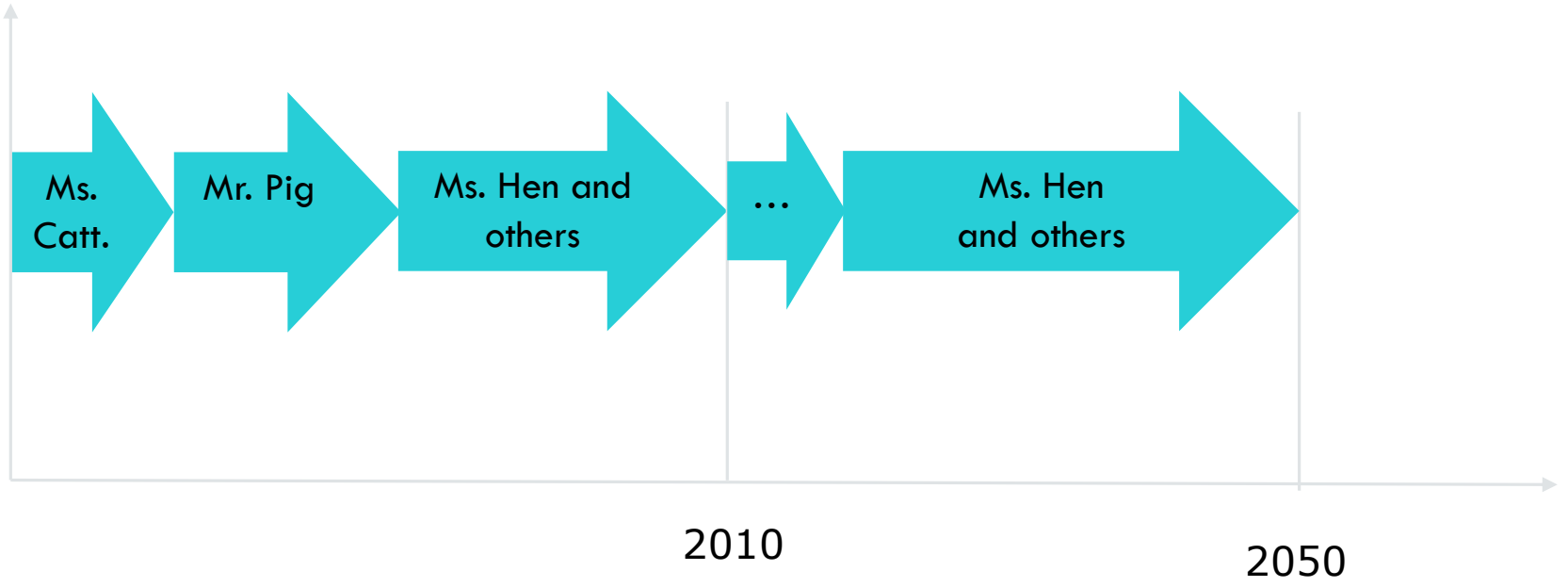
. . . . BUT NEITHER DOES MS. CATTLE PROVIDE THE FULL ANSWER.

- GHG emissions per unit of product can be high, especially where C sequestration potential is low
- Production geographically dispersed, unbalanced, and limited

MORAL OF THE STORY

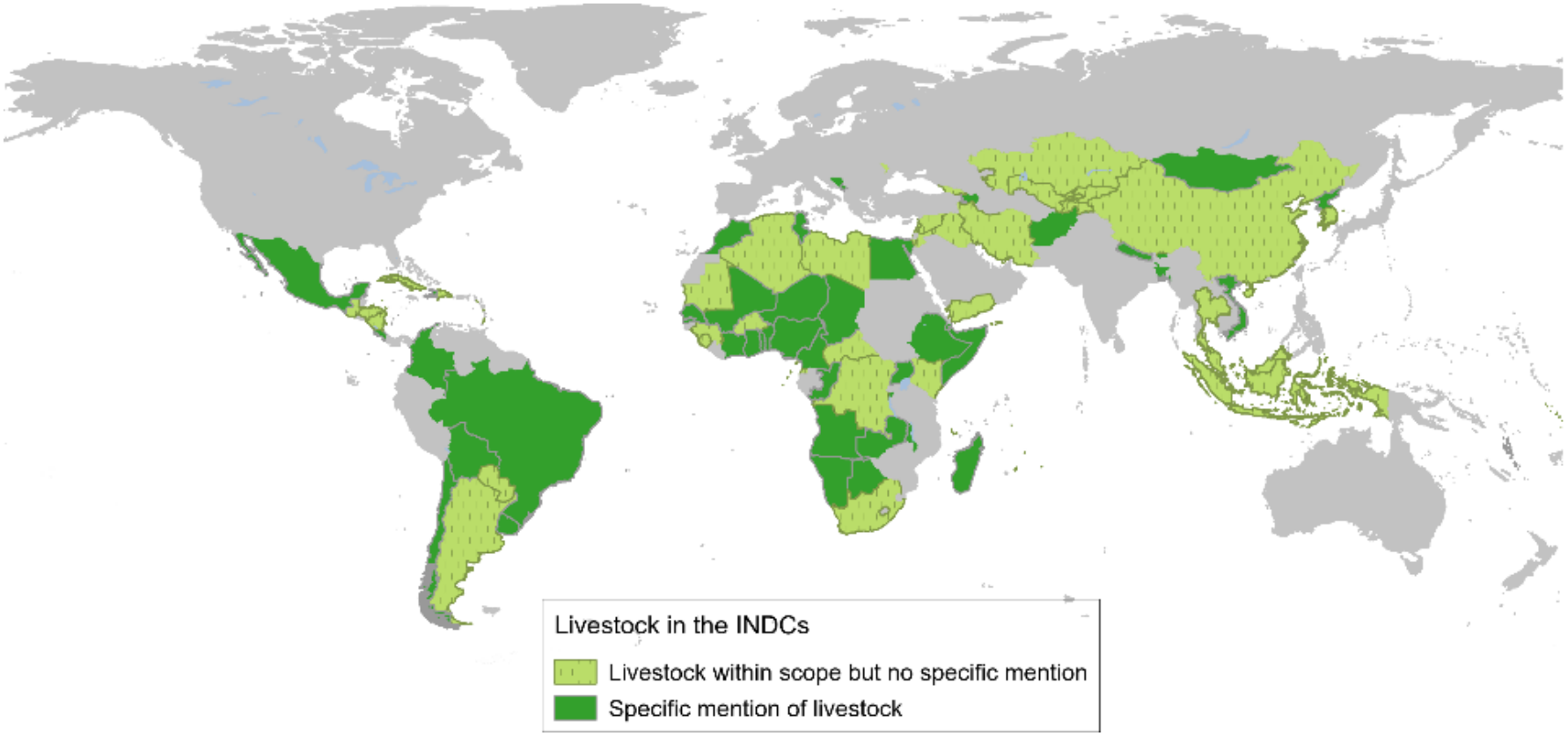
We are too many to hide

WHERE DOES THIS LEAVE US?



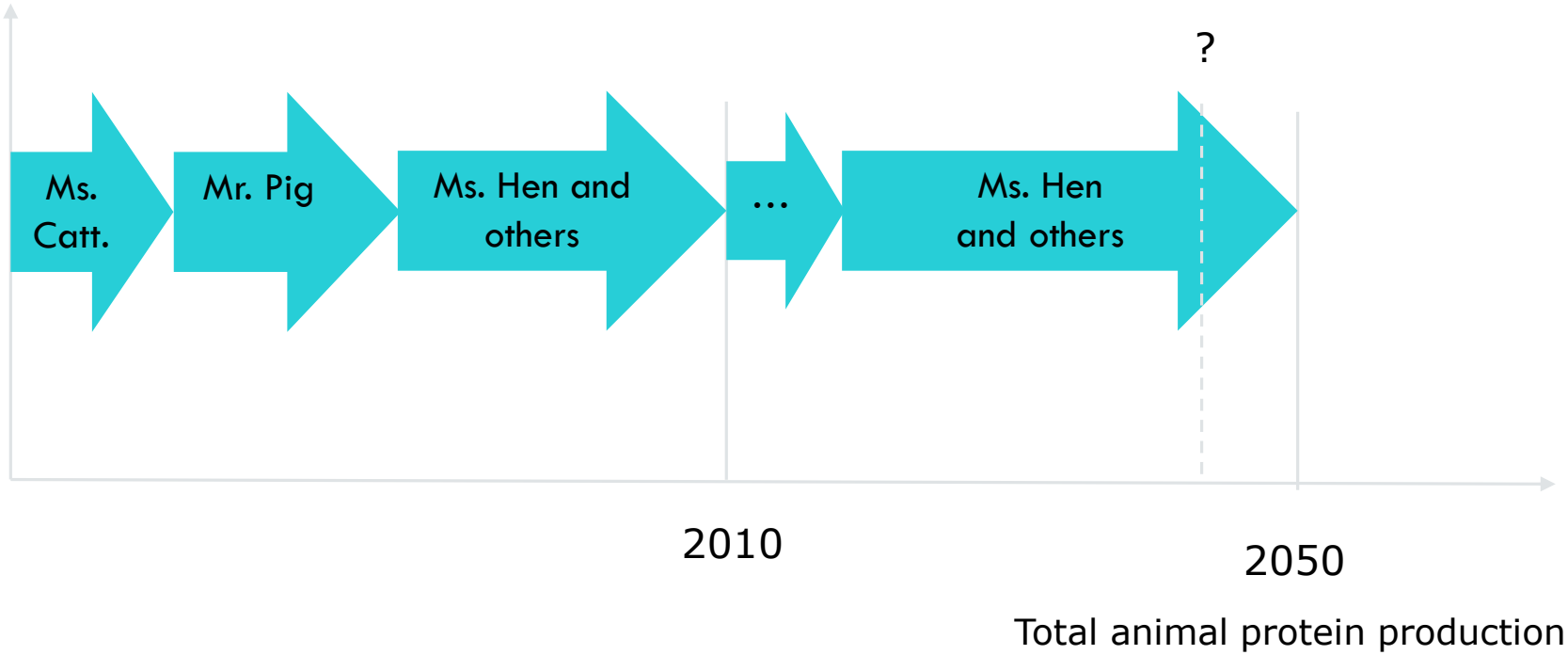
Total animal protein production

NATIONALLY DETERMINED CONTRIBUTIONS



- 92 developing countries include livestock emissions in their (I)NDCs
- Mitigation options include changes towards less resource-intensive diets (IPCC, 1.5° C report)

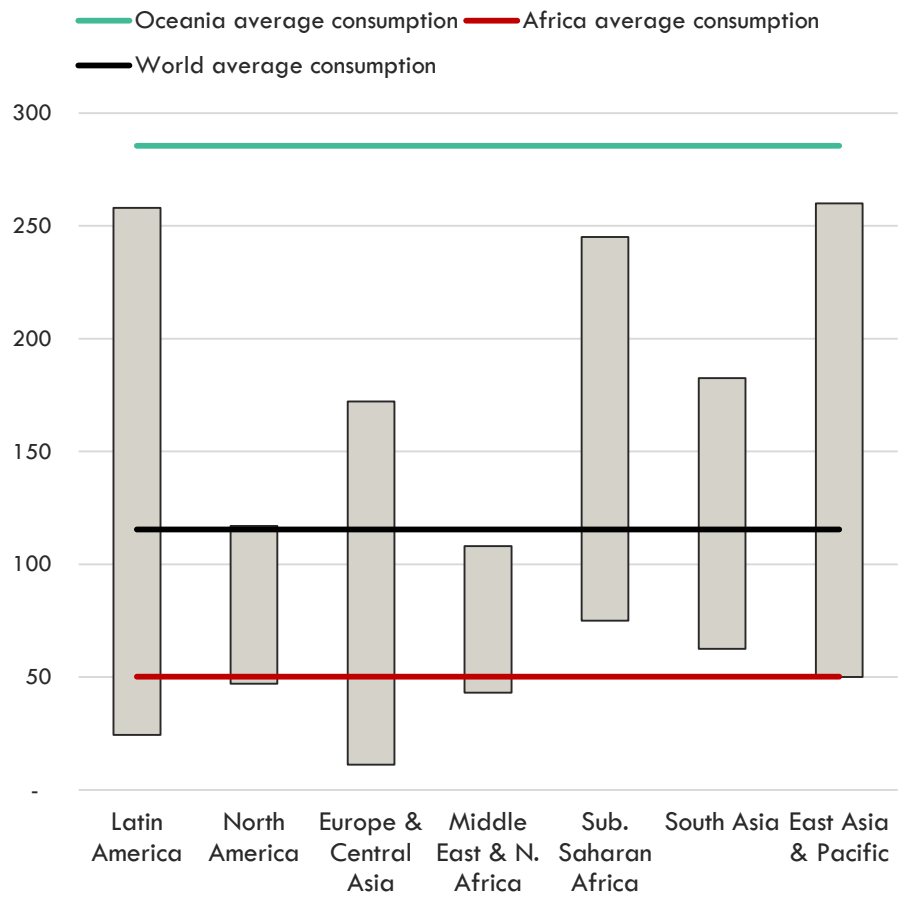
WHERE DOES THIS LEAVE US?



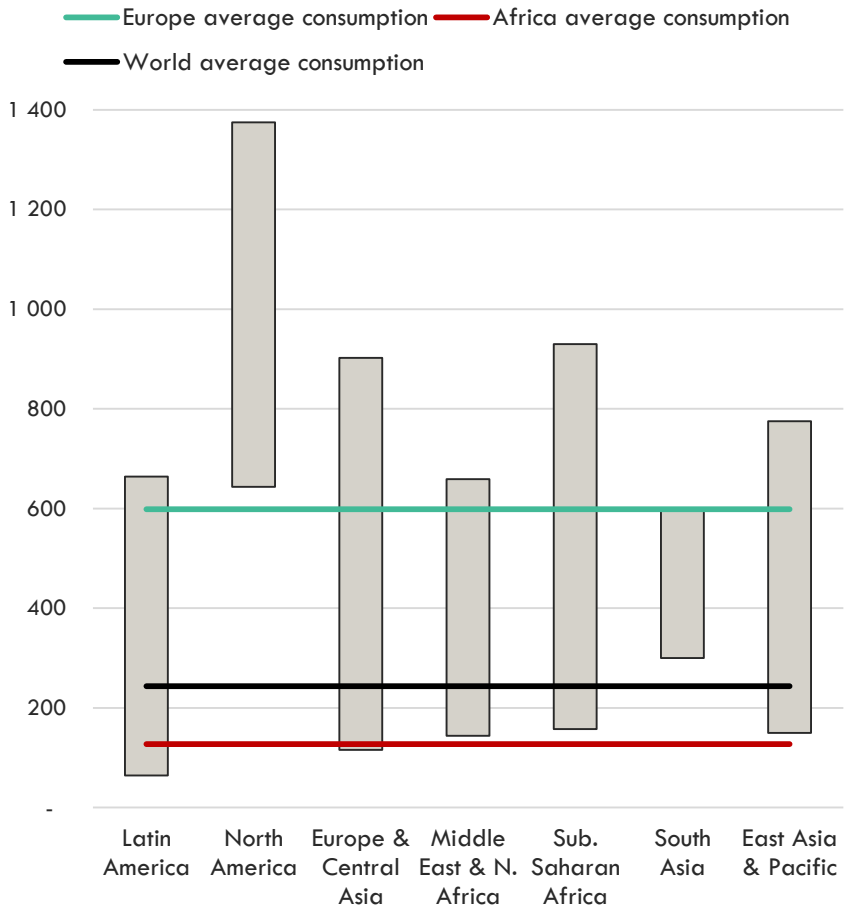
NATIONAL DIETARY RECOMMENDATIONS … WHAT DO THEY SAY ABOUT ANIMAL PRODUCTS?

Range of national dietary recommendations, per region (g/cap/day)

Meat



Dairy



CONCLUDING REMARKS

- Efficiency through technology, circular economies and integration in ecosystems are three broad supply side avenues for improvement: combine and adapt.
- Supply side options alone are unlikely to be sufficient to place the sector on a sustainable path (especially regarding the achievement of climate change mitigation targets).
- Implementation of National Dietary Recommendations would result in a contraction of global meat production, at global scale (not true for milk).
- Limiting overall output levels would enable more production options.

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