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Livestock, climate, and environment: Trends, challenges, and alternative pathways

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**The 2017 EU Agricultural Outlook conference |
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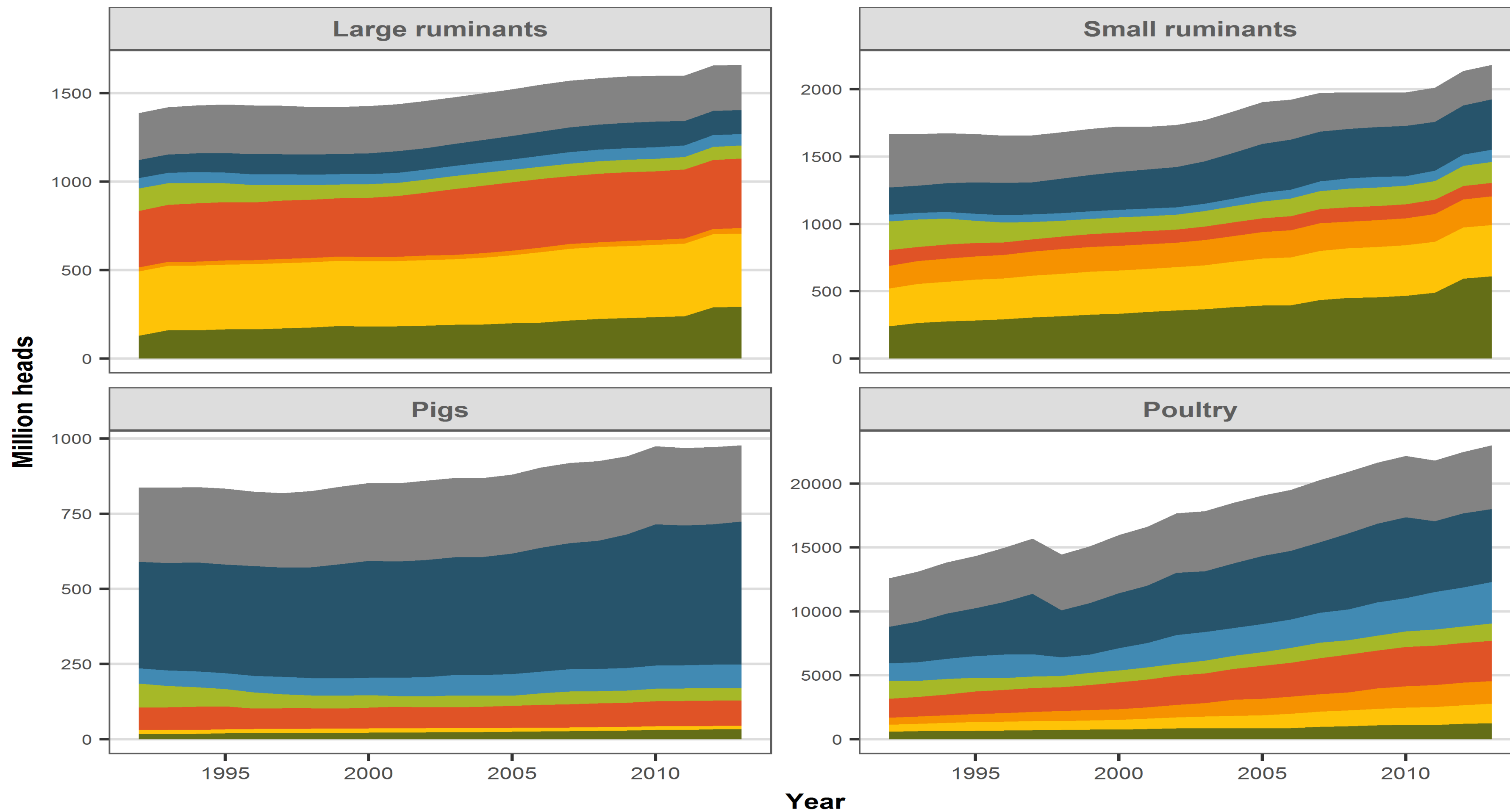


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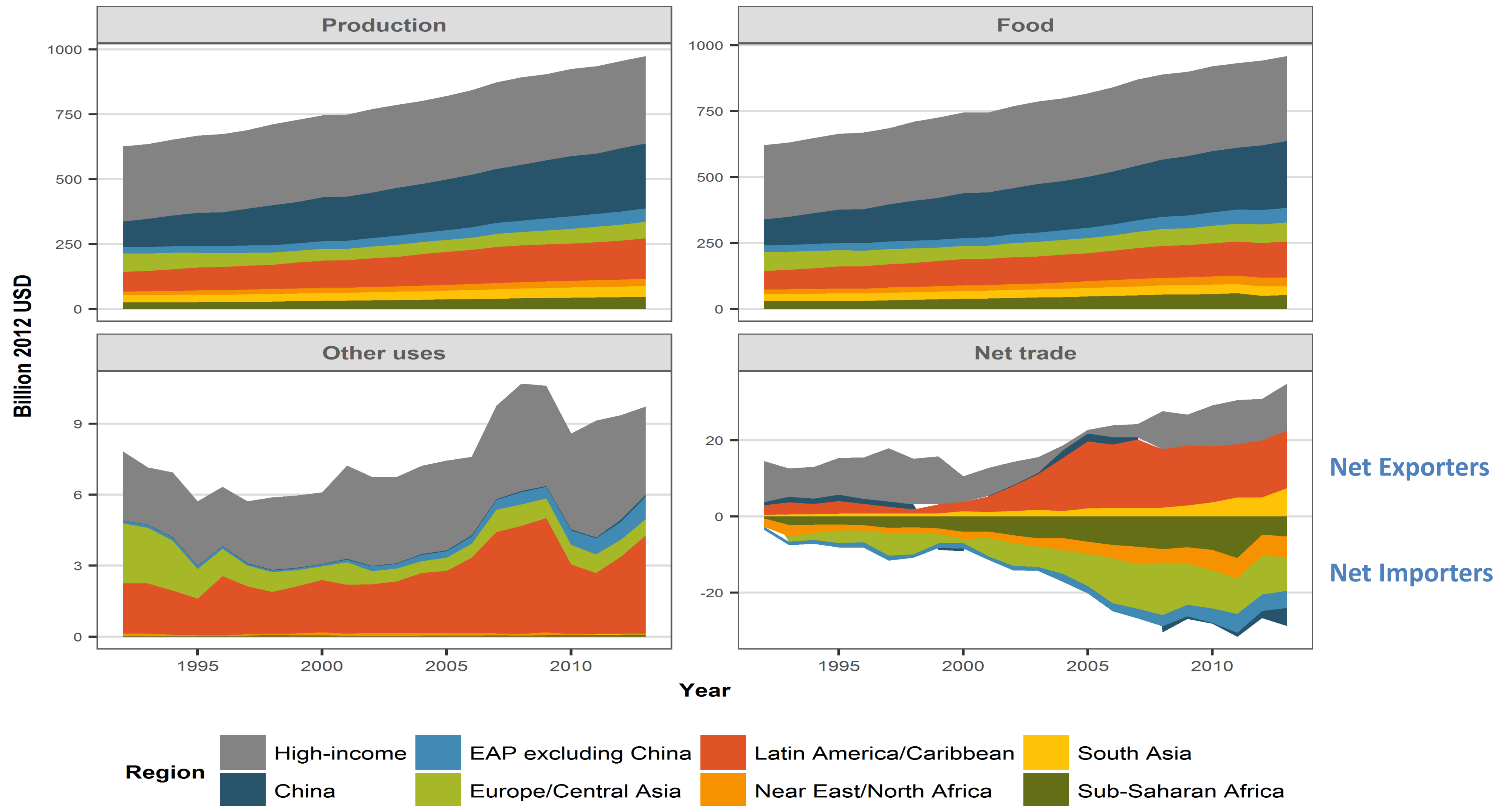


Livestock production: Global trends

Herd sizes by regions



Meat* production by regions



Summary production trends

Herd sizes

- Regional proportions of animal herds fairly stable over last 25 years
- But: recently higher growth rates for ruminant herds in **Sub-Saharan Africa**
- Also: Accelerating growth for poultry in **South Asia** and **Near East/North Africa**
- High-income countries (including EU) have low to negative growth rates for all herds

Meat markets

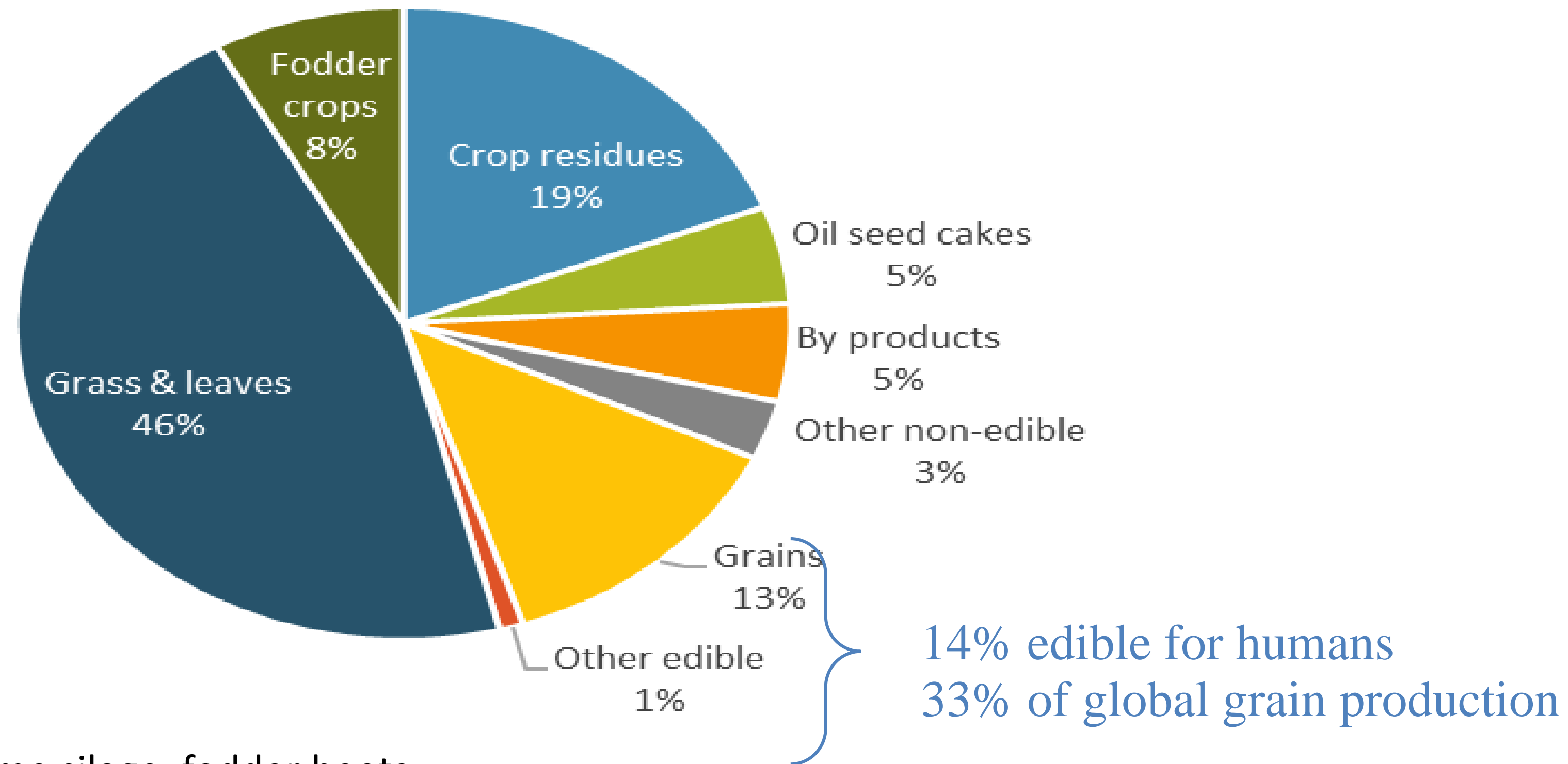
- High-income countries largest producer of meat, China and Latin-America/Caribbean expanding
- International trade of meat and meat products expanded but remains low compared to domestic production and food use
- Domestic demand largely met by domestic production



Livestock production: Feed, land, and emissions

Global livestock feed ration composition

6 Billion tons dry matter



Fodder crops: grain and legume silage, fodder beets

Crop residues: straws and stover, sugar cane tops, banana stems

By-products: brans, corn gluten meal and feed, molasses, beetroot pulp and spent breweries, distilleries, biofuel grains

Other non-edible: second grade cereals, swill, fishmeal, synthetic amino acids, lime

Other edible: cassava pellets, beans and soy beans, rapeseed and soy oil

Land-use for livestock production

Global land-use for forage and feed production by regions and species (million ha).

		Grasslands suitable for crops	Grasslands unsuitable for crops	Cereal and legume silage, fodder beet	Cereals grains	Oil seed and oil seed cakes	Other crops ^a	By-products ^b	Crop residues ^c	Total
Non OECD	Cattle & buffaloes	436.2	442.6	46.8	42.7	22.7	0	22.1	100.7	1113.8
	Small Ruminants	139.9	769.6	9.1	0.7	0.9	0	2.1	17.8	940.1
	Poultry	0	0	0	73.8	43.4	0.7	1.4	0	119.23
	Pigs	0	0	0	24.7	27.0	1.4	2.8	4.2	60.1
OECD	Cattle & buffaloes	88.5	40.0	9.6	28.0	8.2	0	3.7	2.2	180.2
	Small Ruminants	20.3	12.2	0.4	0.9	0.2	0	0.5	0.9	35.4
	Poultry	0	0	0	19.3	16.9	0.0	0.0	0	36.2
	Pigs	0	0	0	20.4	12.0	0.8	0.5	0.3	34.0
World	Cattle & buffaloes	524.7	478.5	56.5	70.7	30.9	0	25.8	103.0	1290.1
	Small Ruminants	160.3	781.8	9.5	1.6	1.1	0	2.6	18.6	975.5
	Poultry	0	0	0	93.1	60.3	0.7	1.4	0	155.5
	Pigs	0	0	0	45.1	39.0	2.5	3.3	4.4	94.0
	All	684.9	1260.4	65.9	210.5	131.3	2.9	33.1	126.0	2,505.6

^a Pulses, cassava and banana

^b Corn gluten feed and meal, brans, middling, molasses, sugar beet pulp, and by-products from breweries, distilleries and biofuels

^c Straws, sugar cane tops, banana stems

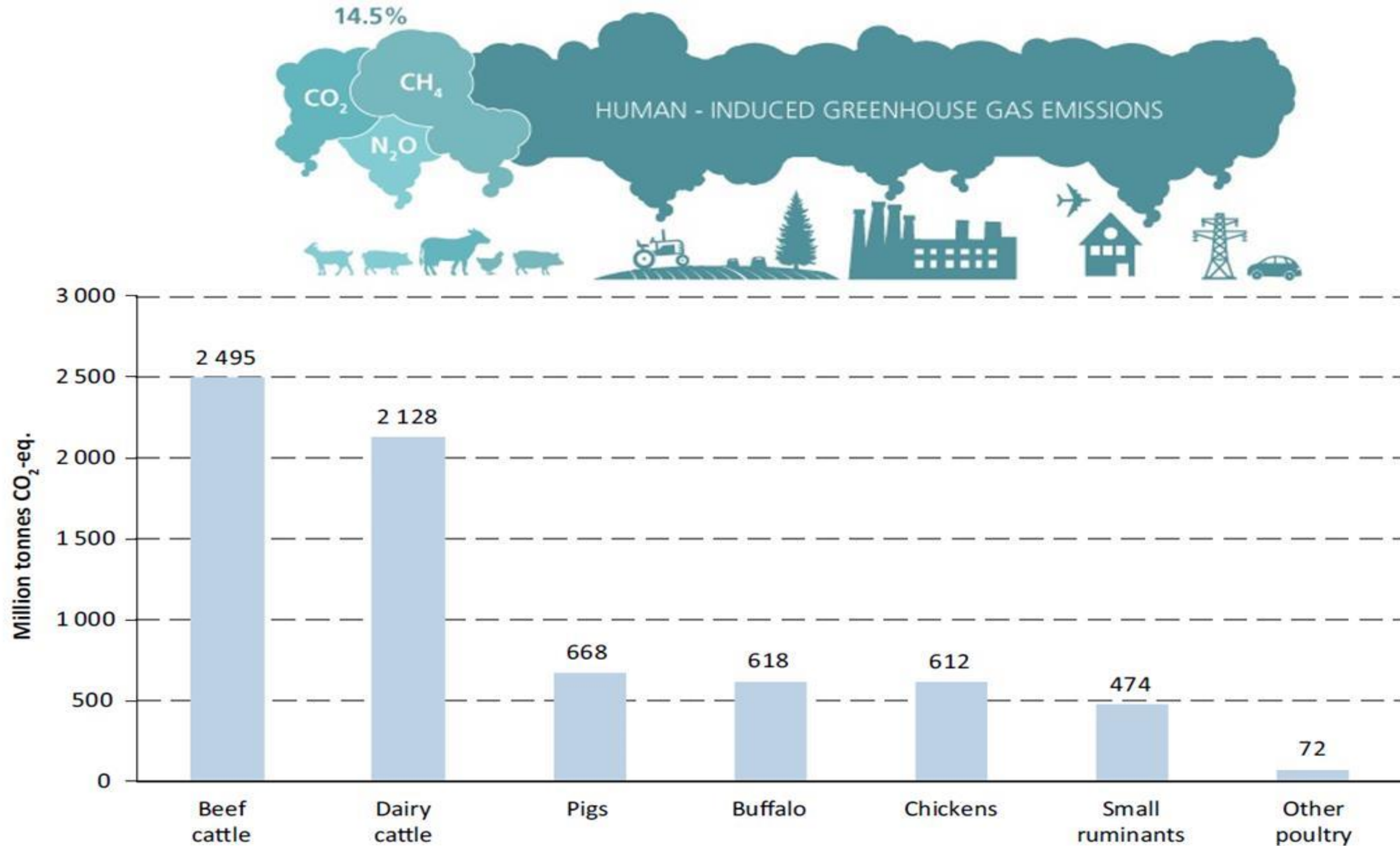
At global scale:

- 2505 million ha used for livestock production
- 1260 million ha on grassland not suitable for crops, ~ 50%

OECD Countries:

- 286 million ha used for livestock
- 52 million ha on grassland not suitable for crops, ~ 18%

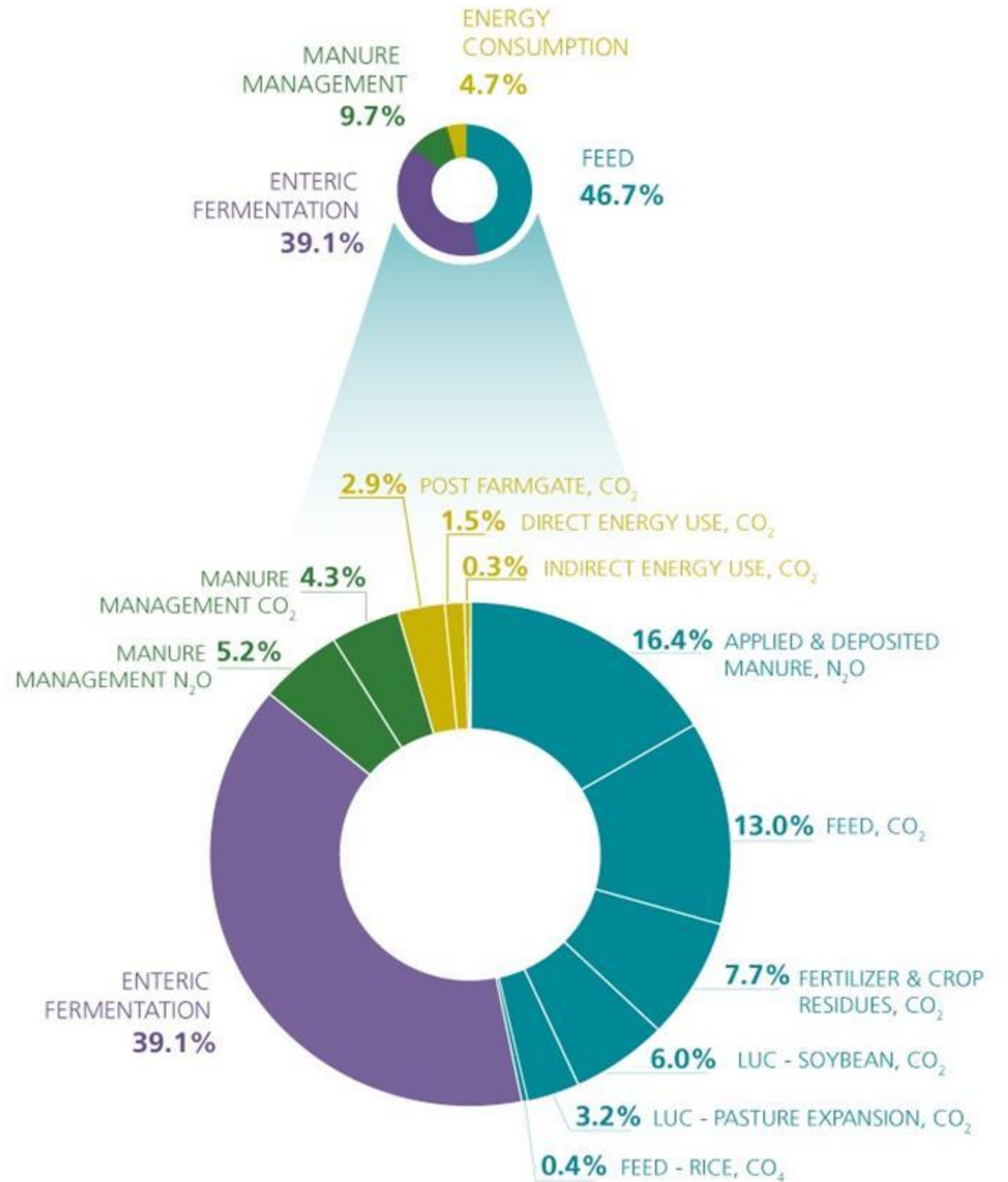
Total GHG emissions from livestock supply chains



* Includes emissions attributed to edible products and to other goods and services, such as draught power and wool.

Source: GLEAM.

KEY SOURCES OF EMISSIONS



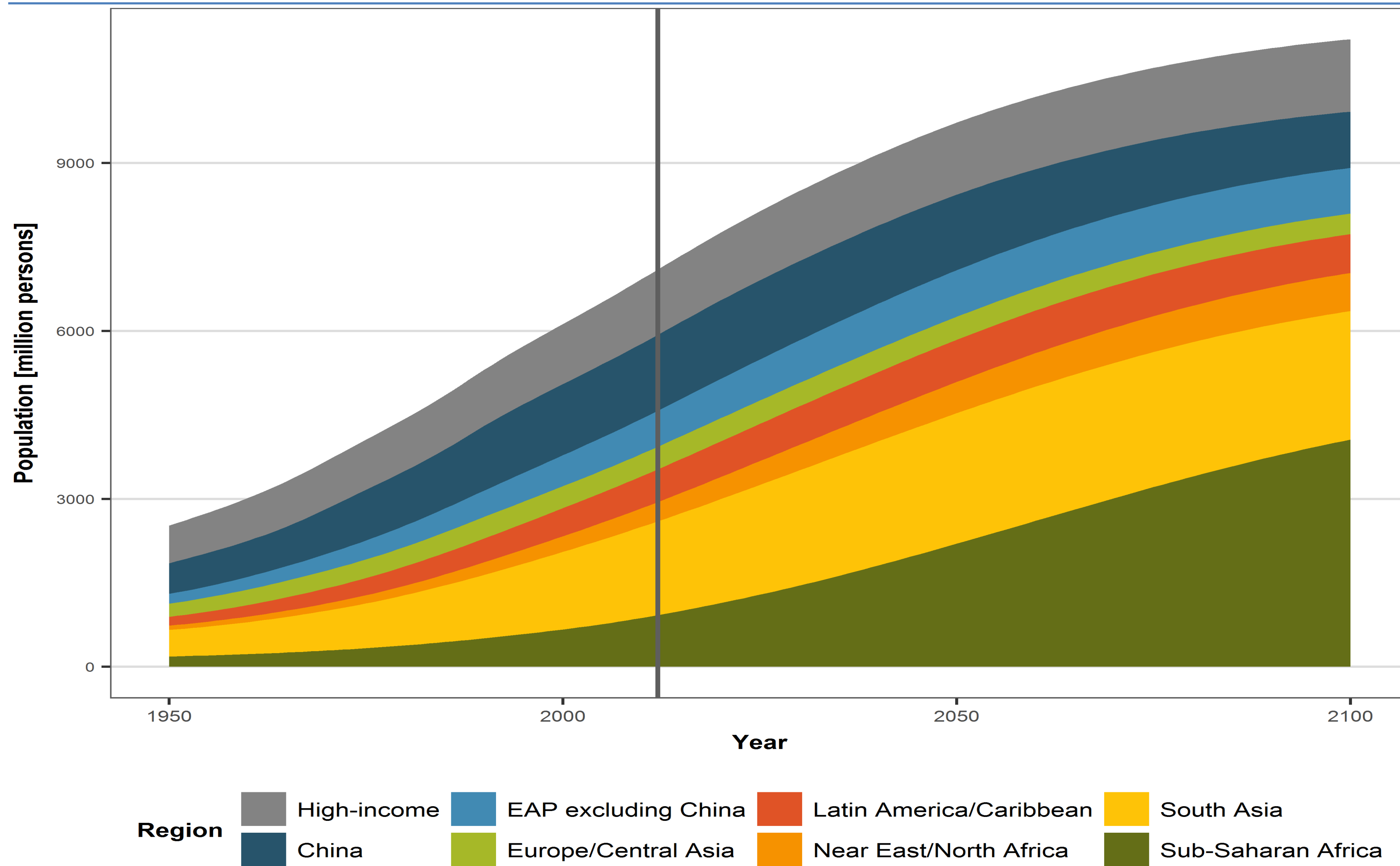
Summary feed, land, and emissions

- 33% percent of grain production used for feed (but not all immediately usable for human consumption).
- Half of the area required for livestock production uses grassland that is not usable for crop production.
- 14.5% of global greenhouse gas emissions originate from livestock production:
 - Large ruminants have highest share
 - Feed production and enteric fermentation contribute most

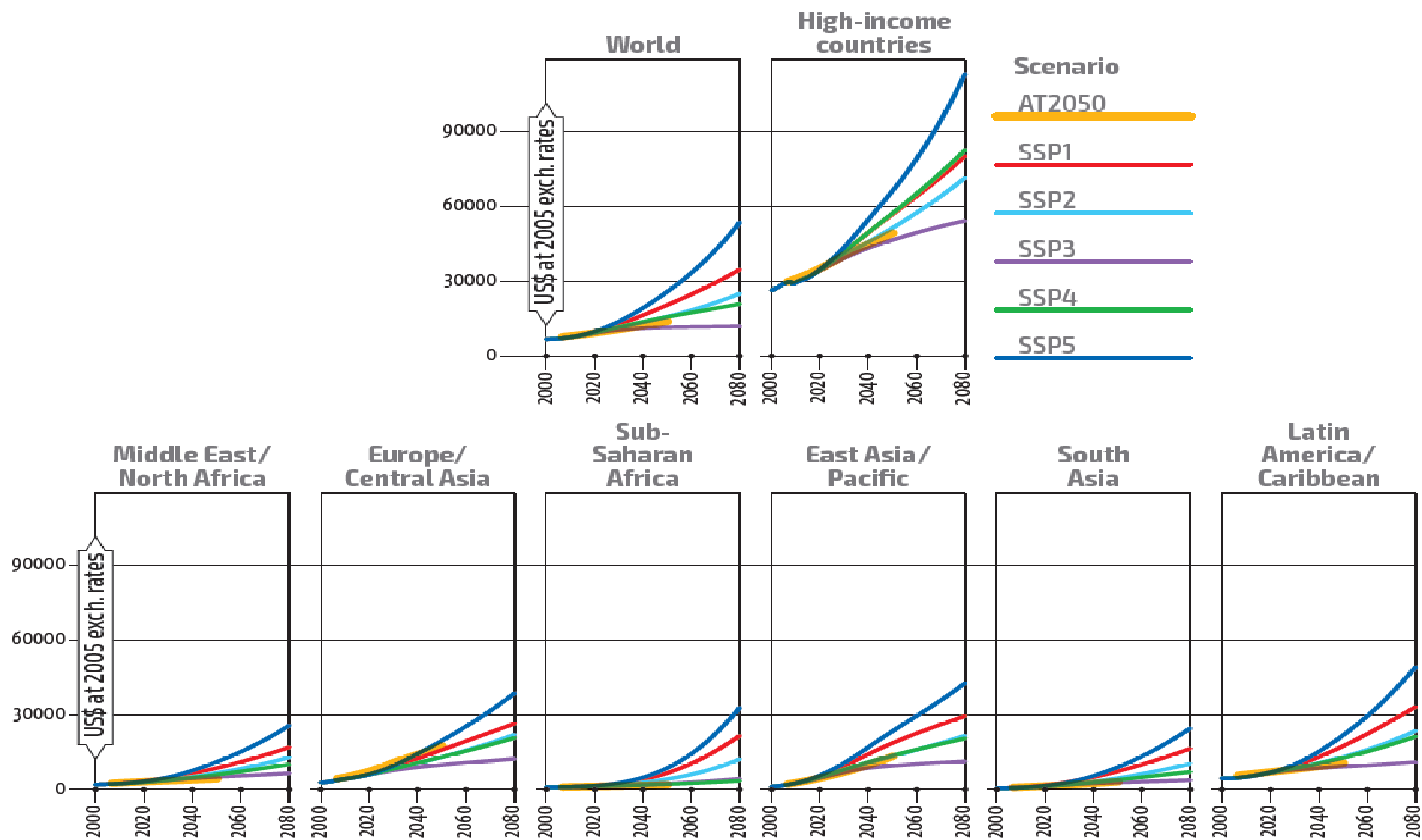


Challenges ahead and alternative pathways

Global population projections



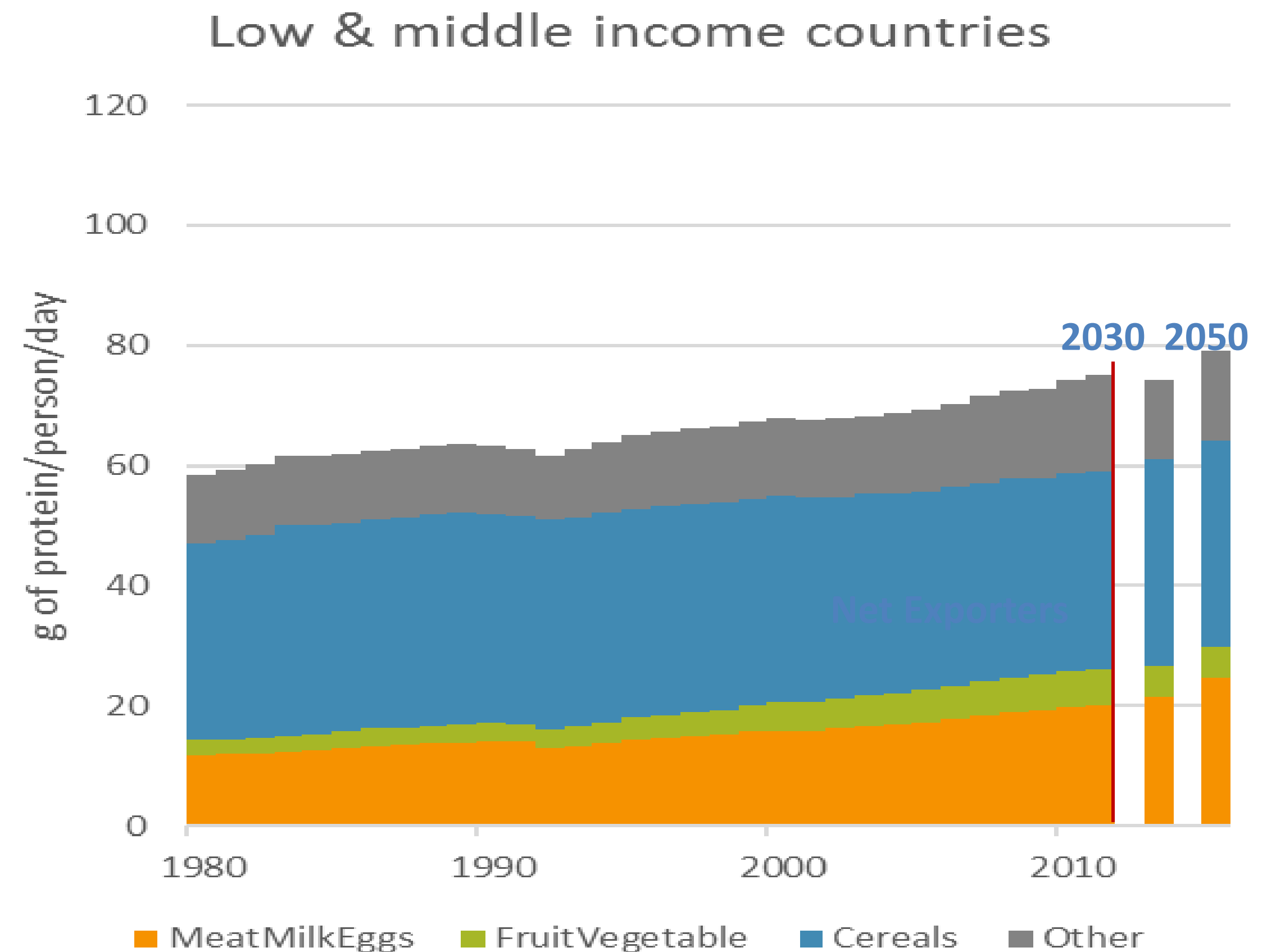
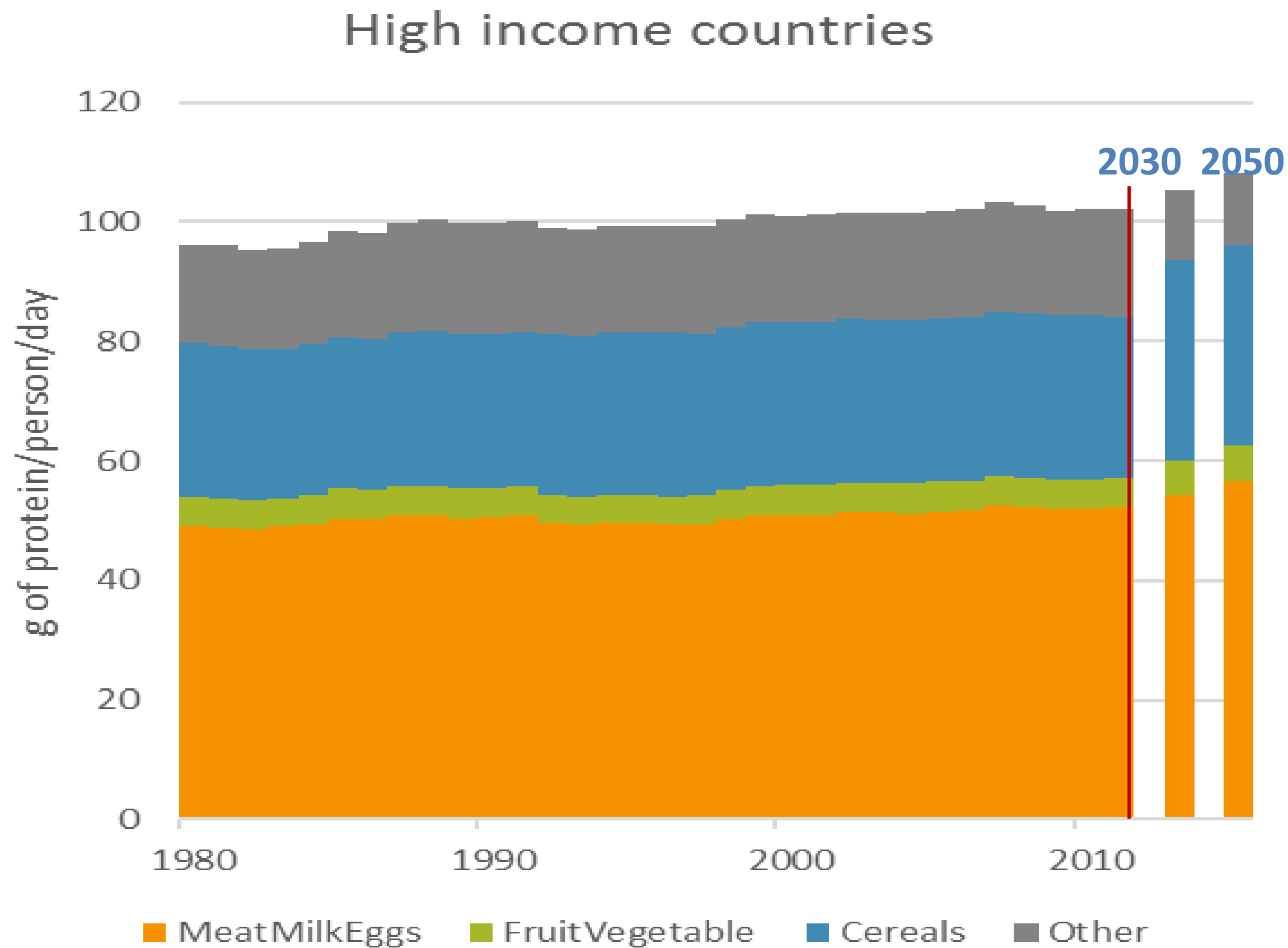
Income per capita projections (Shared Socio-Economic Pathways, SSP)



Note: Regional groups do not include high-income countries.

Source: FAO Global Perspectives Studies, based on IIASA, 2016; Alexandratos and Bruinsma, 2012.

Protein consumption per capita, historical and projections



Notes:

Projections start after red vertical line

All commodity groups expressed in primary equivalents

Due to different definitions, direct comparison between "Other" and "Cereals" not always possible

Source: FAO 2017

Summary challenges

- Largest population growth projected for Sub-Saharan Africa and South Asia
- Projections for income per capita vary substantially across scenarios (here Shared Socio-Economic Pathways), but:
 - Low- income countries do not catch up to high-income countries
- Increased income causes higher demand for food protein per capita, animal products (meat, milk, eggs) gain importance in low- and middle income countries
- If domestic demand continues to be mainly met by domestic production (as in the past), large expansion of animal production in Sub-Saharan Africa to be expected
 - Expansion of ruminant herds and poultry
- Global greenhouse gas emissions from livestock continue to grow

Possible alternative pathways

- Investment in feed production technologies in major producing regions to reduce emissions (46.7% of livestock-related emissions)
- Improved feed efficiency and composition of animal diets to reduce emissions from enteric fermentation (39.1% of livestock-related emissions)
- Reduction of animal products share in high-income countries' diets
- Global trade integration: Production in regions with comparative advantage, including emission and energy efficiency?

Global Perspectives Studies at FAO: Publications

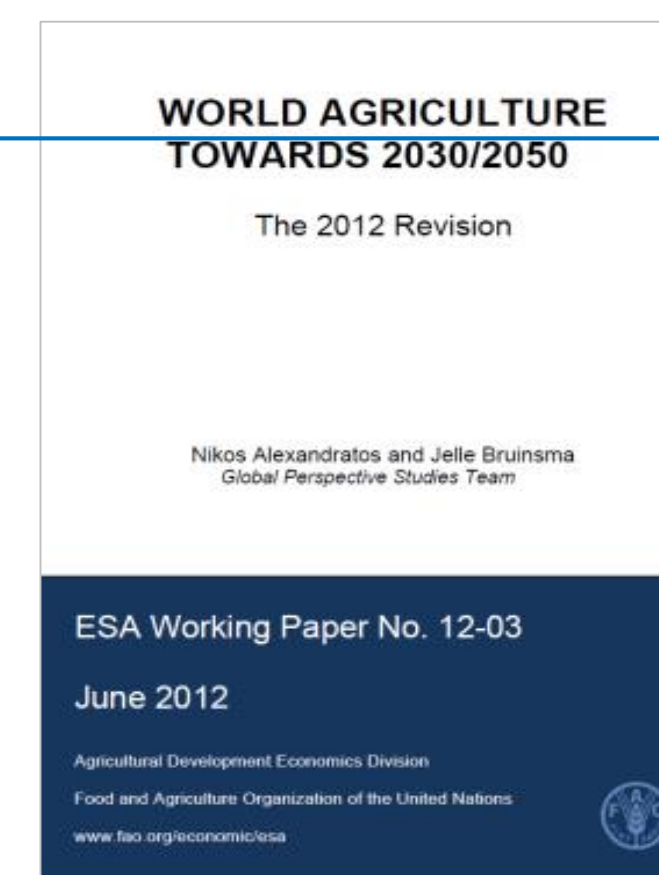
Corporate reports on key issues

- E.g. report on “*The future of food and agriculture: Trends and challenges*” (FAO, 2017)

World Agriculture towards 20XX

- long-term projections of agriculture, food security and natural resource use. Last baseline projection until 2050 (Alexandratos and Bruinsma, 2012)

Upcoming report: The Future of Food and Agriculture: Alternative pathways to 2050 – January 2018





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Thank you!

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