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TUKFS Conference 2026

International trade and the environmental benefits of diet change in the United Kingdom

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Acknowledgements

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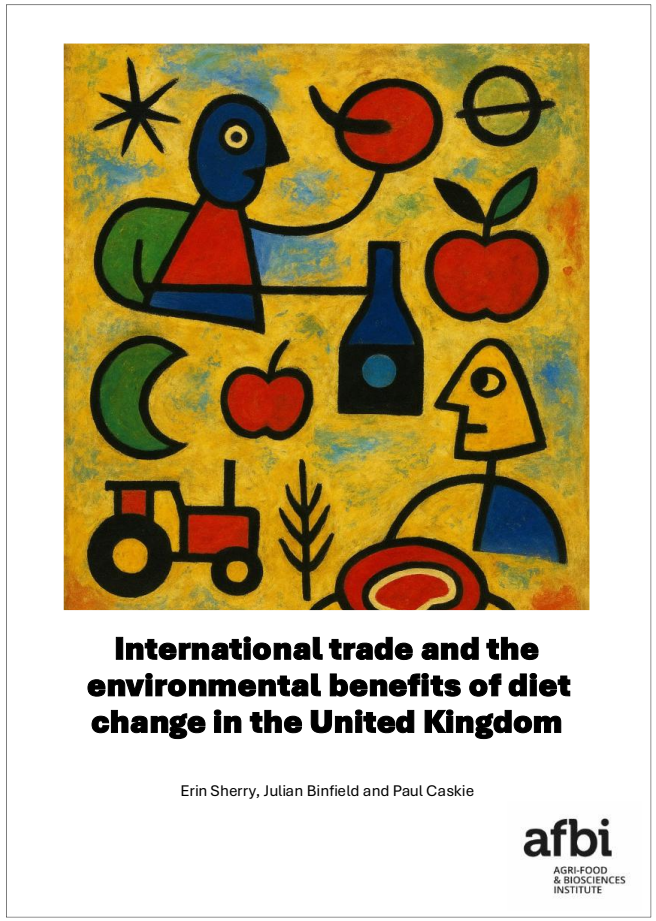
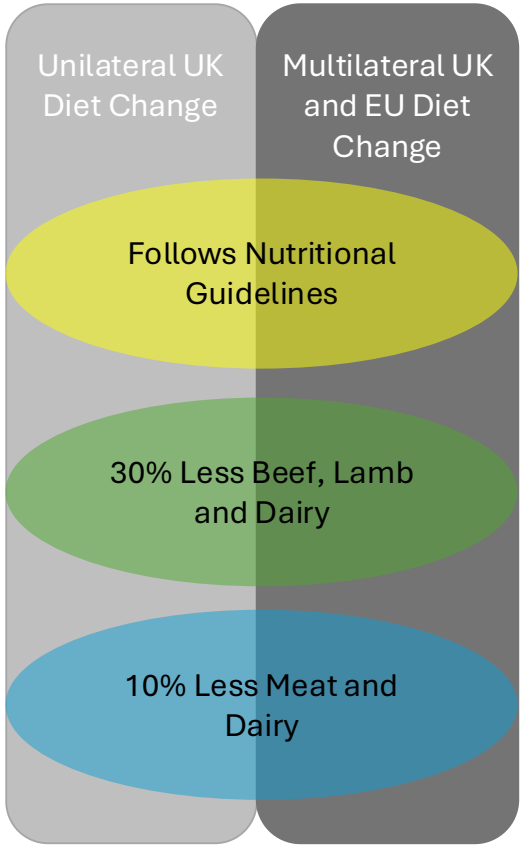


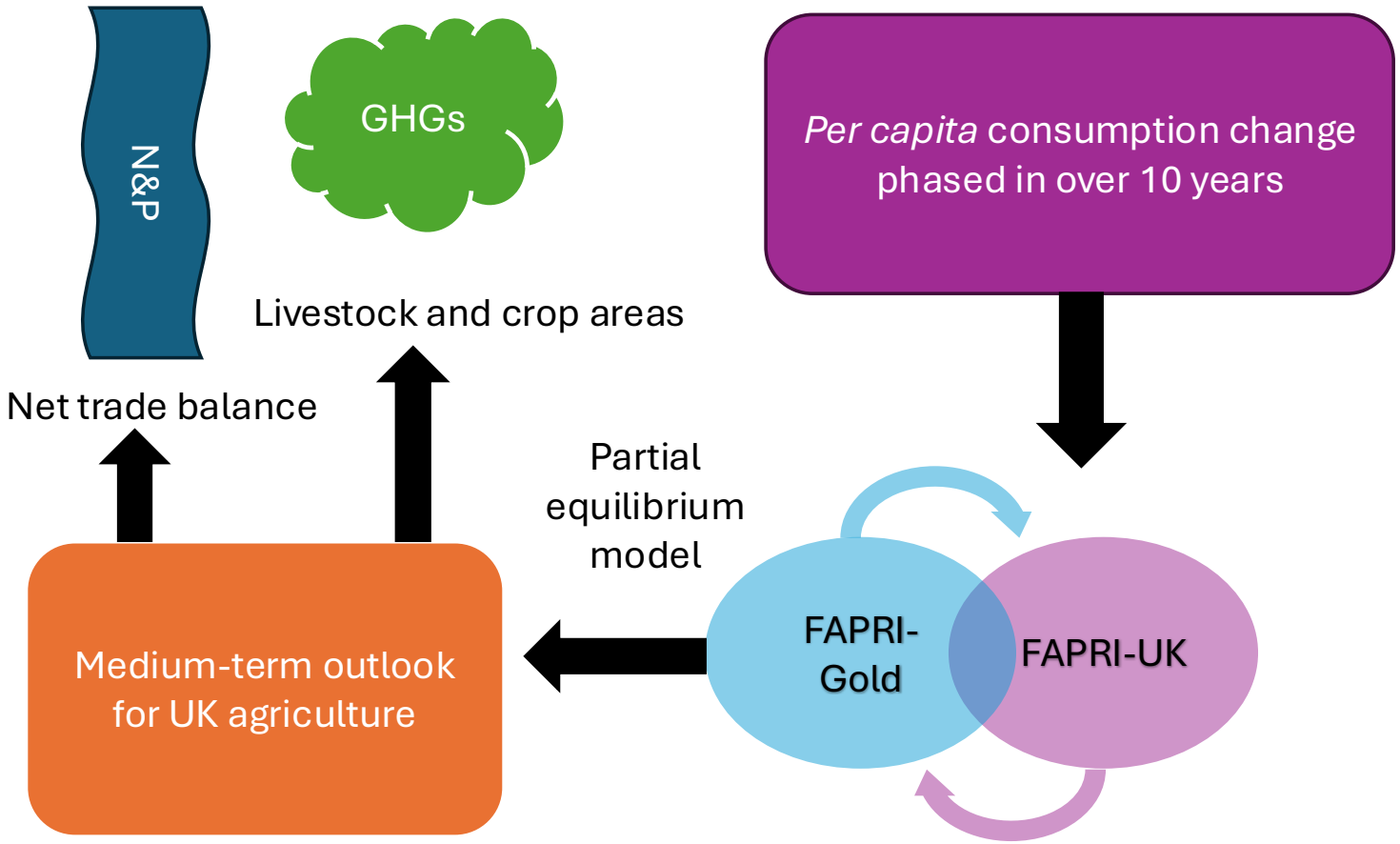
Six scenarios compared to *status quo*



- Three patterns of diet transition
  - WP1 diet mapped to agricultural commodities
  - Ruminant-derived foods reduced
    - Replaced primarily with chicken, pigmeat
  - All meat and dairy reduced
    - Replaced primarily by eggs and fish

- Two assumptions about scope of adoption
  - Diets only change in the UK
  - Diets change in the UK and the EU-15
    - Half the magnitude, but same pattern
    - -30% in UK, -15% in EU-15

Methodology



Price and production

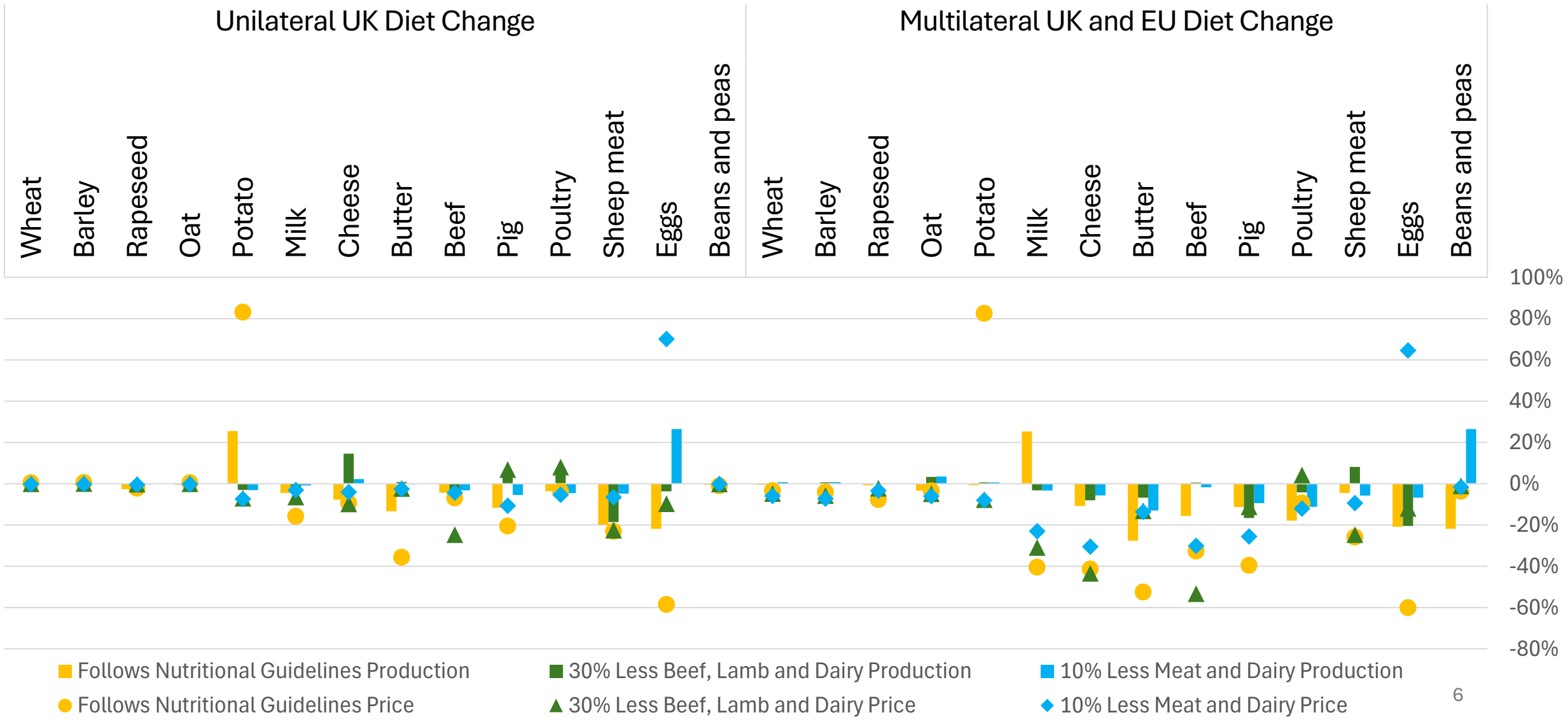
Weak price signals

- Internationally integrated
- Diet change UK-only
- Limited production response
- Little change to affordability

Strong price signals

- Less internationally integrated
- UK and EU diet change
- Larger production response
- Affordability paradox
  - Encouraged foods - expensive
  - Discouraged foods - cheaper

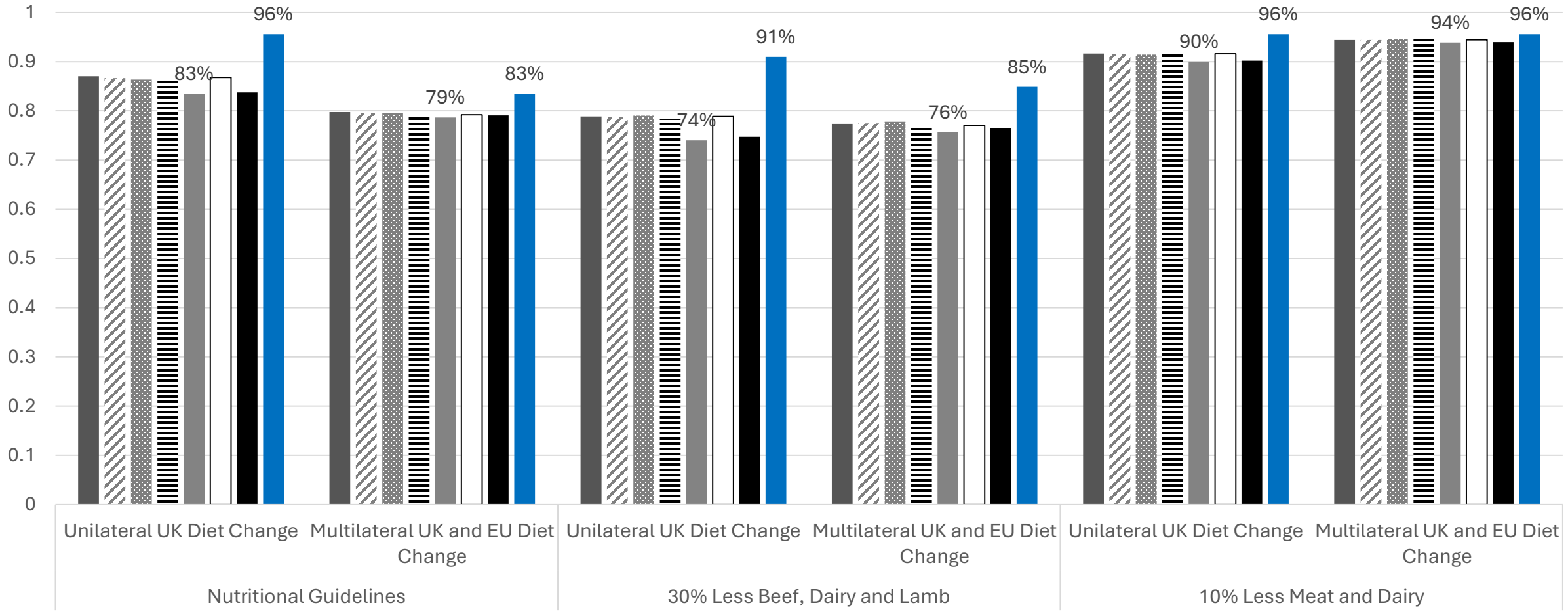
Percent difference (right axis) in production and prices between diet change scenarios and the business as usual in the tenth year



CH_4 and N_2O emissions reduce

- -17% using production-based accounting
- -26% using consumption-based accounting
- Mitigation improves if
  - multilateral UK-EU changes in 2/3 diets
  - unilateral UK changes in 1/3 diets
  - Relatively more emission-intensive imports

Consumption and production greenhouse gas emissions for selected commodities* as a proportion of the *status quo* in the tenth year of diet transition



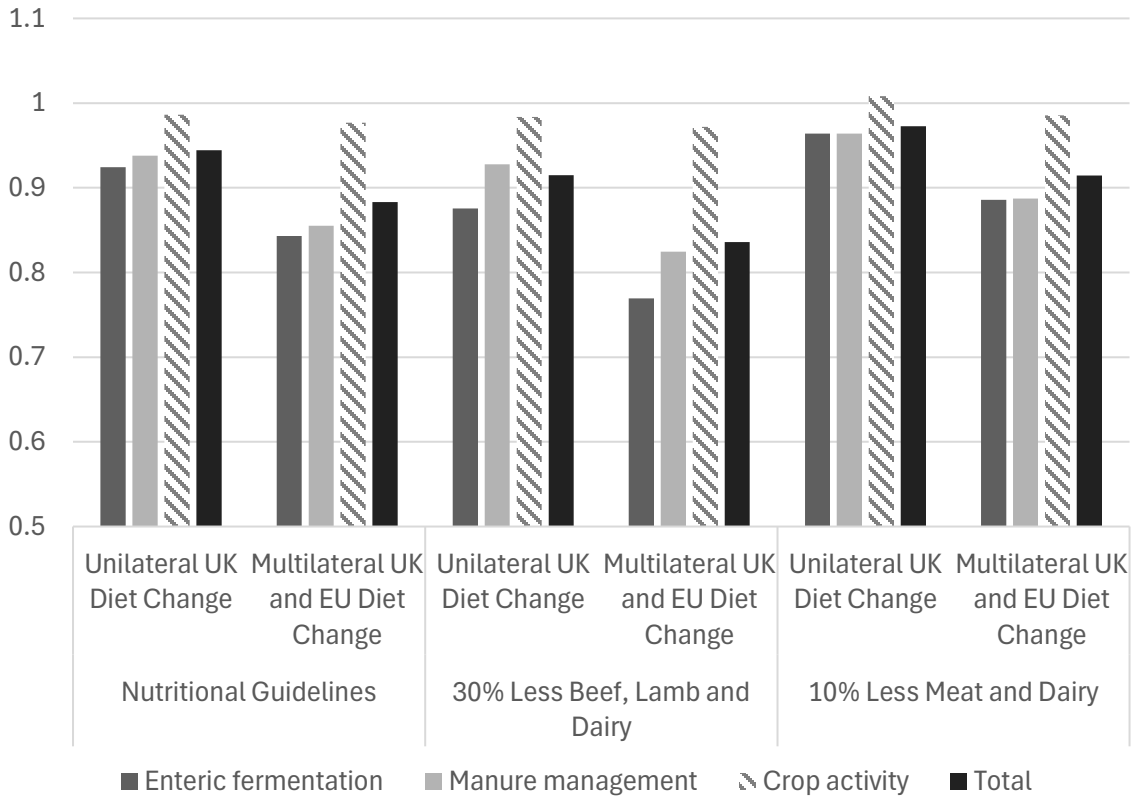
Trade-offs between environmental indicators

- Enteric fermentation and manure management emissions reduce
- Crop-related emissions increase
- Net reduction in CH_4 and N_2O (production-based)

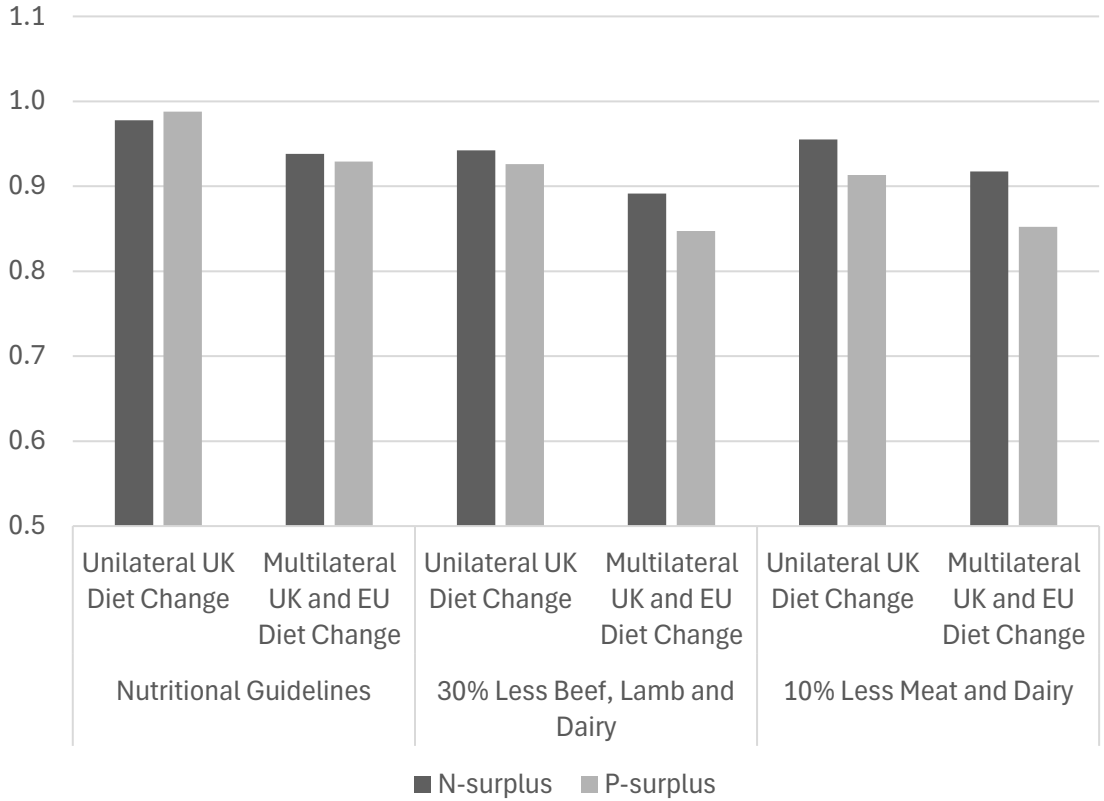
- Assumed diets modelled improve N and P balances
- Poultry, pig and fertilizer demand increases countered by reduction in overall feed imports

Environmental indicators expressed as a proportion of the tenth year in the BAU

Methane and Nitrous oxide emissions



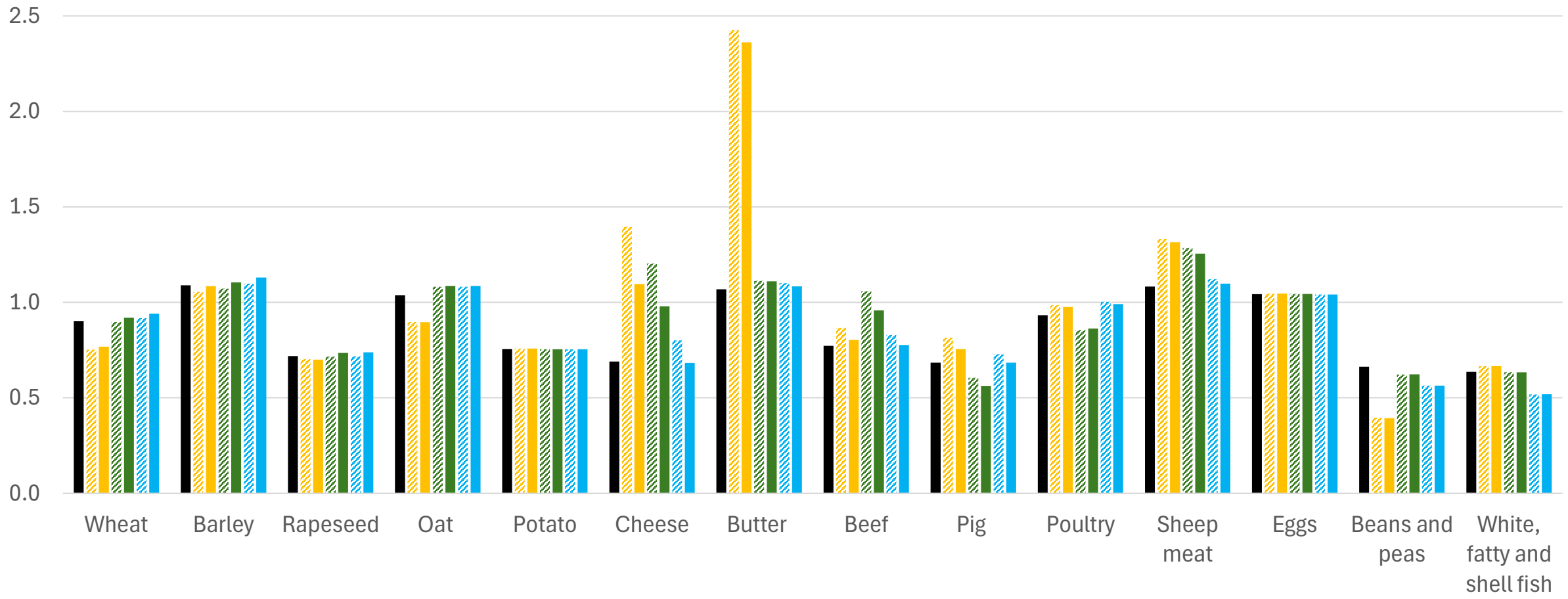
Nitrogen and phosphorus soil surplus



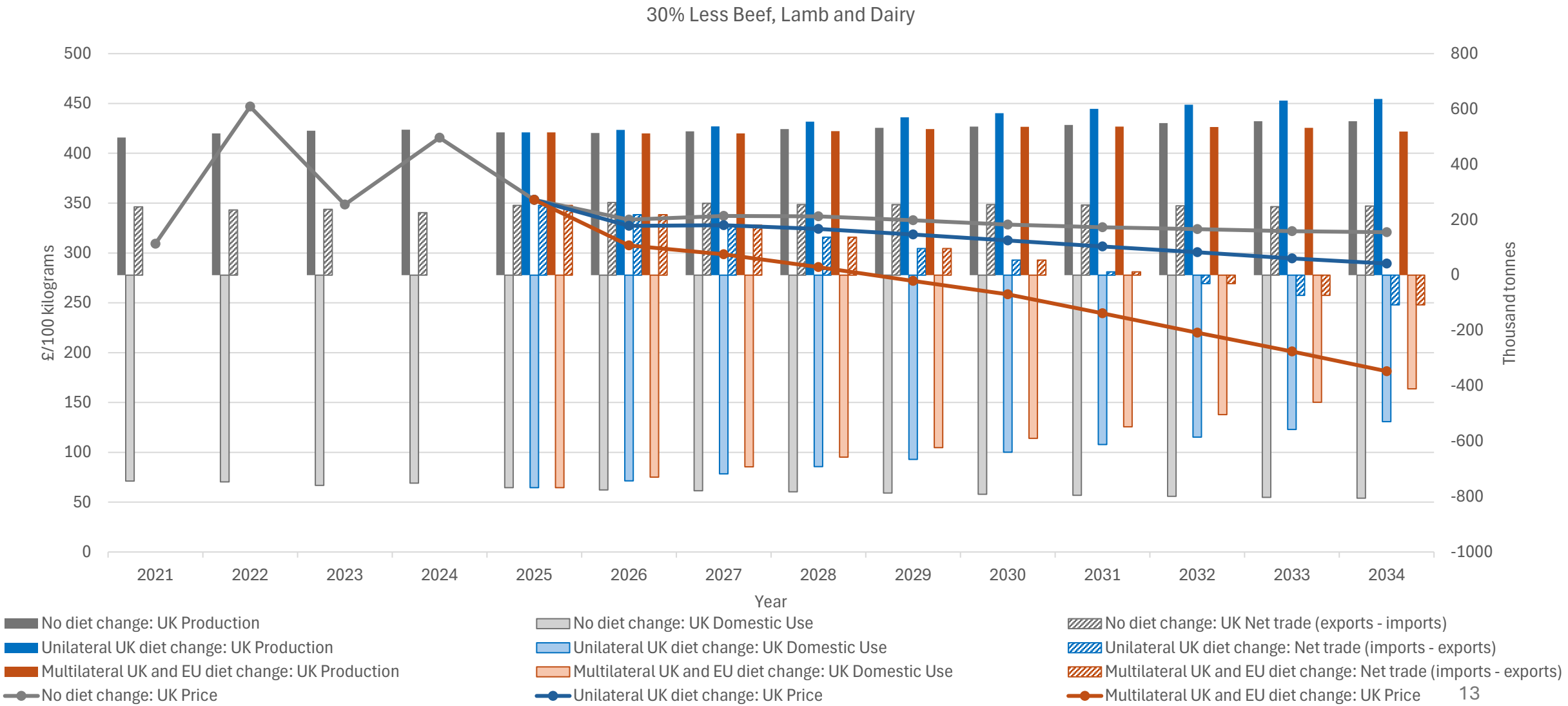
International trade

- Diet change can shift competitiveness and present arbitrage opportunities
- Can benefit either domestic or foreign producers
- Self-sufficiency changes can summarise production+trade effects

Self-sufficiency (production : domestic use)



Cheese supply and use (right axis) and price (left axis)



Thank you

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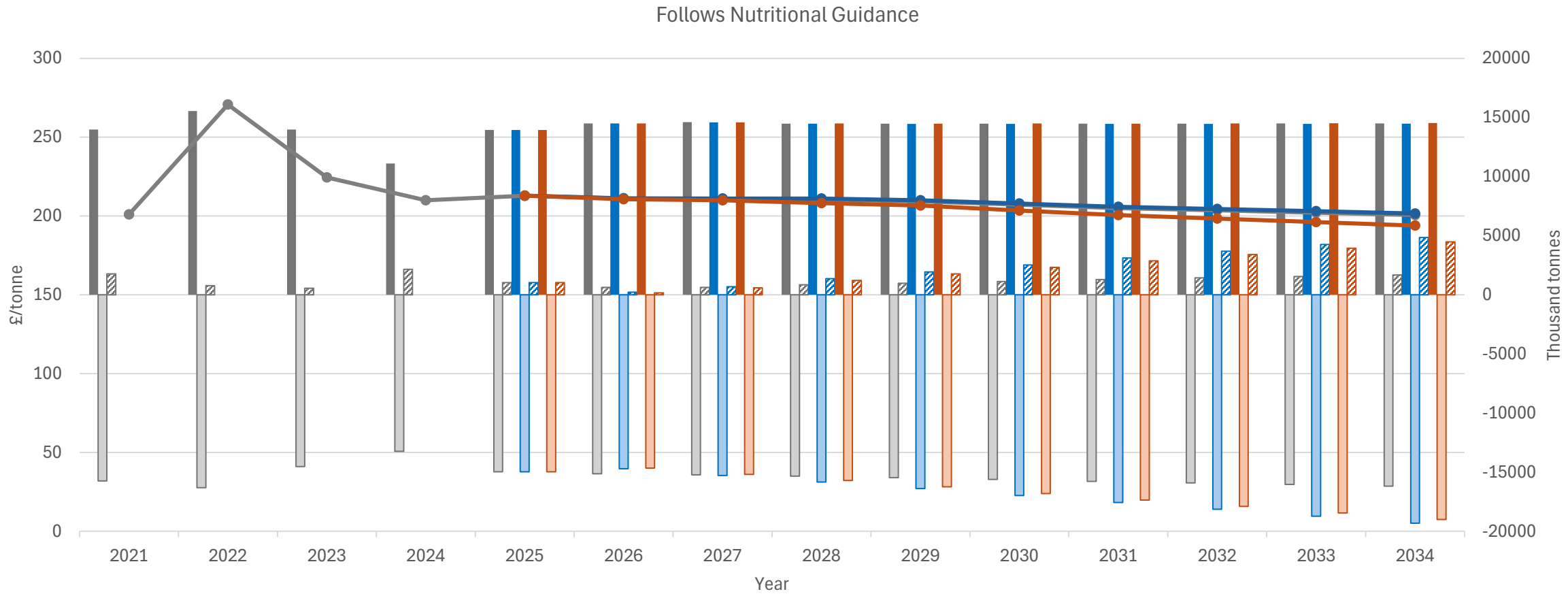
Diet transitions modelled (tenth year)

Commodity	Follows Nutritional Advice		30% Less Beef, Lamb and Dairy		10% Less Meat and Dairy	
	Assumed *per capita* consumption	Percent difference from *status quo*	Assumed *per capita* consumption	Percent difference from *status quo*	Assumed *per capita* consumption	Percent difference from *status quo*
Wheat	170.9	40%	122.6	0%	120.8	-1%
Barley	30.9	23%	26.1	4%	26.1	4%
Maize	20.6	61%	11.8	-7%	11.8	-7%
Oats	10.3	25%	7.6	-7%	7.6	-7%
Rapeseed oil	7.3	-35%	10.7	-5%	10.7	-5%
Sunflower oil	3.5	-25%	4.5	-3%	4.5	-3%
Soy oil	2.9	-41%	4.7	-4%	4.7	-4%
Potatoes	116.5	37%	81.9	-4%	81.9	-4%
Peas and beans	23.1	127%	11.5	12%	13.6	34%
Sugar	0.0	-100%	29.1	-3%	29.1	-3%
Beef	12.9	-15%	10.2	-33%	13.6	-10%
Sheepmeat	2.6	-35%	2.7	-31%	3.7	-8%
Pigmeat	14.8	-26%	23.3	17%	17.7	-11%
Poultry	27.3	-9%	35.0	17%	26.6	-11%
Eggs	12.2	-22%	15.1	-4%	19.9	27%
Milk	87.7	5%	57.8	-31%	77.4	-7%
Cheese	5.1	-54%	7.3	-34%	9.8	-12%
Butter	1.3	-62%	3.2	-3%	3.2	-3%
White fish	4.8	34%	3.7	4%	5.0	39%
Oily fish	4.4	-39%	6.2	-15%	8.3	14%

Wheat supply and use (right) and price (left)



Key message: complexity of agriculture

Structural relationships

- Limit / delay market response
- Climactic constraints
  - Crops, varieties and quality
- Lags and uncertainty
  - Livestock breeding cycles

Secondary impacts

- Commodity interdependencies
- Intermediate inputs
  - Feed for livestock
- Biproducts
  - Beef from dairy cows

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Mandala
Transforming urban food systems

Transforming UK Food Systems Conference, 23-24 March 2026

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